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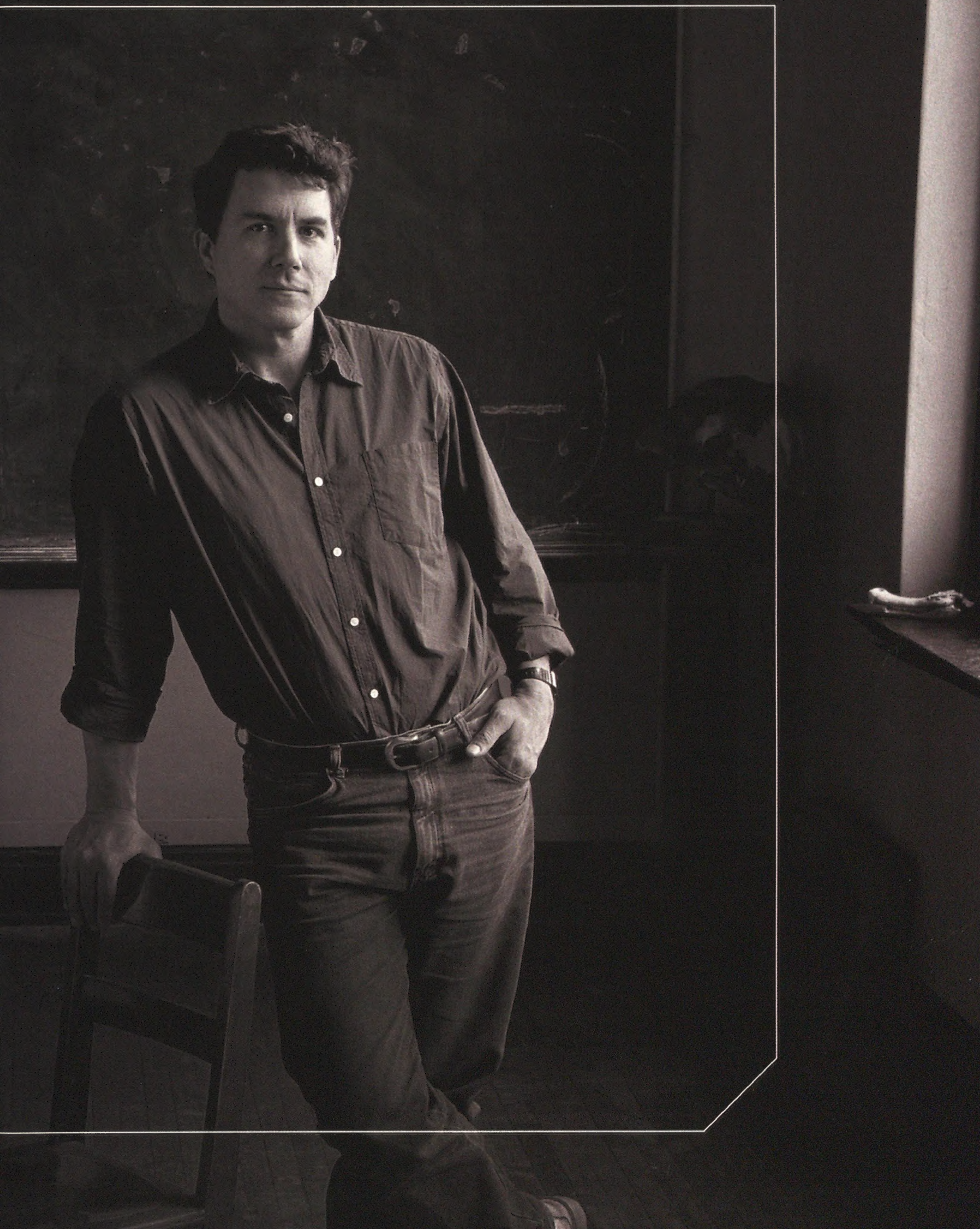

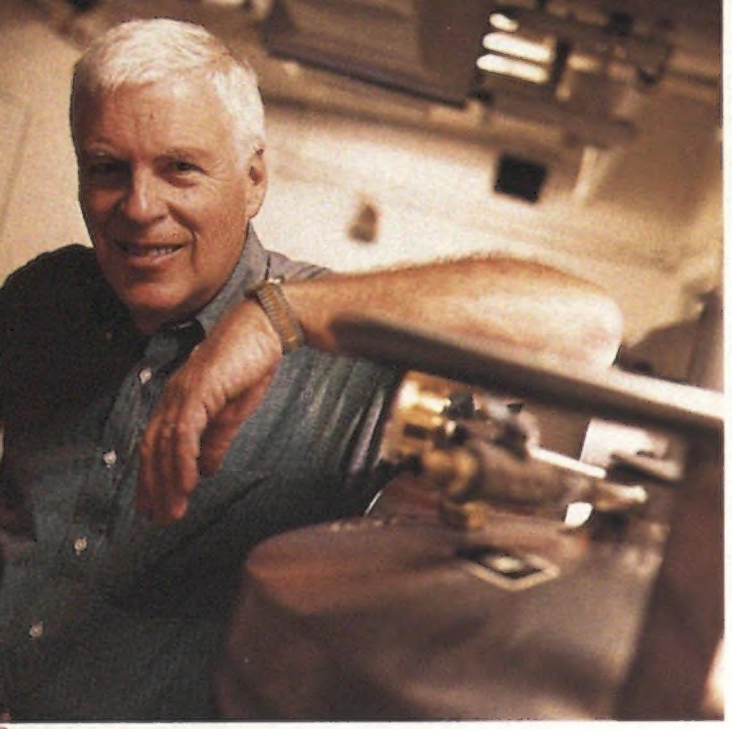

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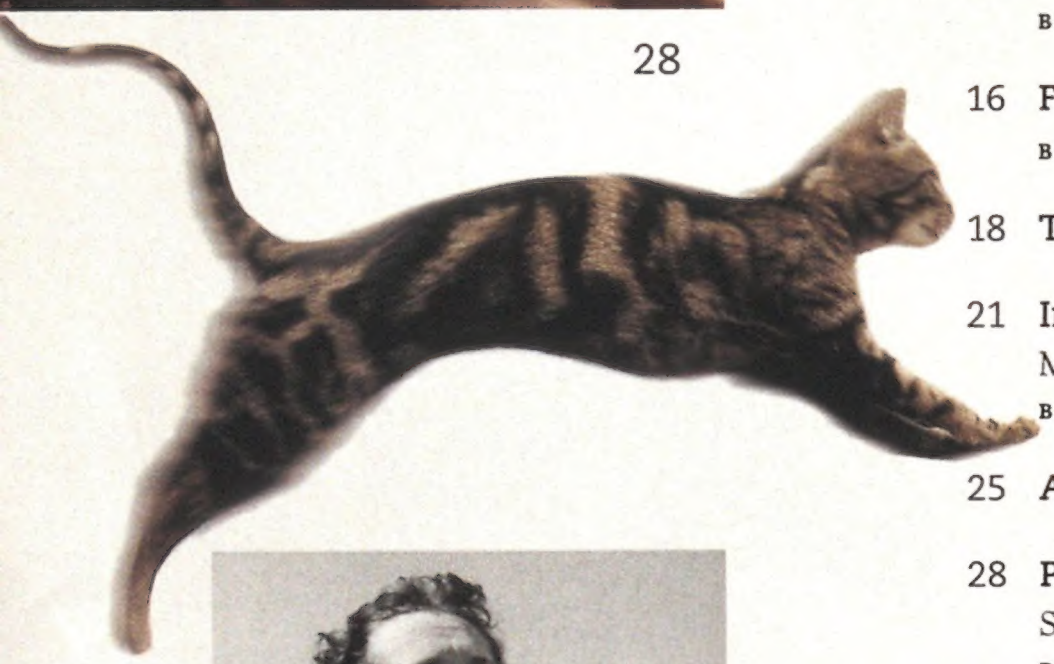

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From top: Stephen O'Brien is head of the Cat Genome Project in Frederick, Maryland; *Silent Spring* author Rachel Carson walks near her summer home in Maine, circa 1960; a steelworker's tool belt was used in the rescue and recovery effort at the World Trade Center.

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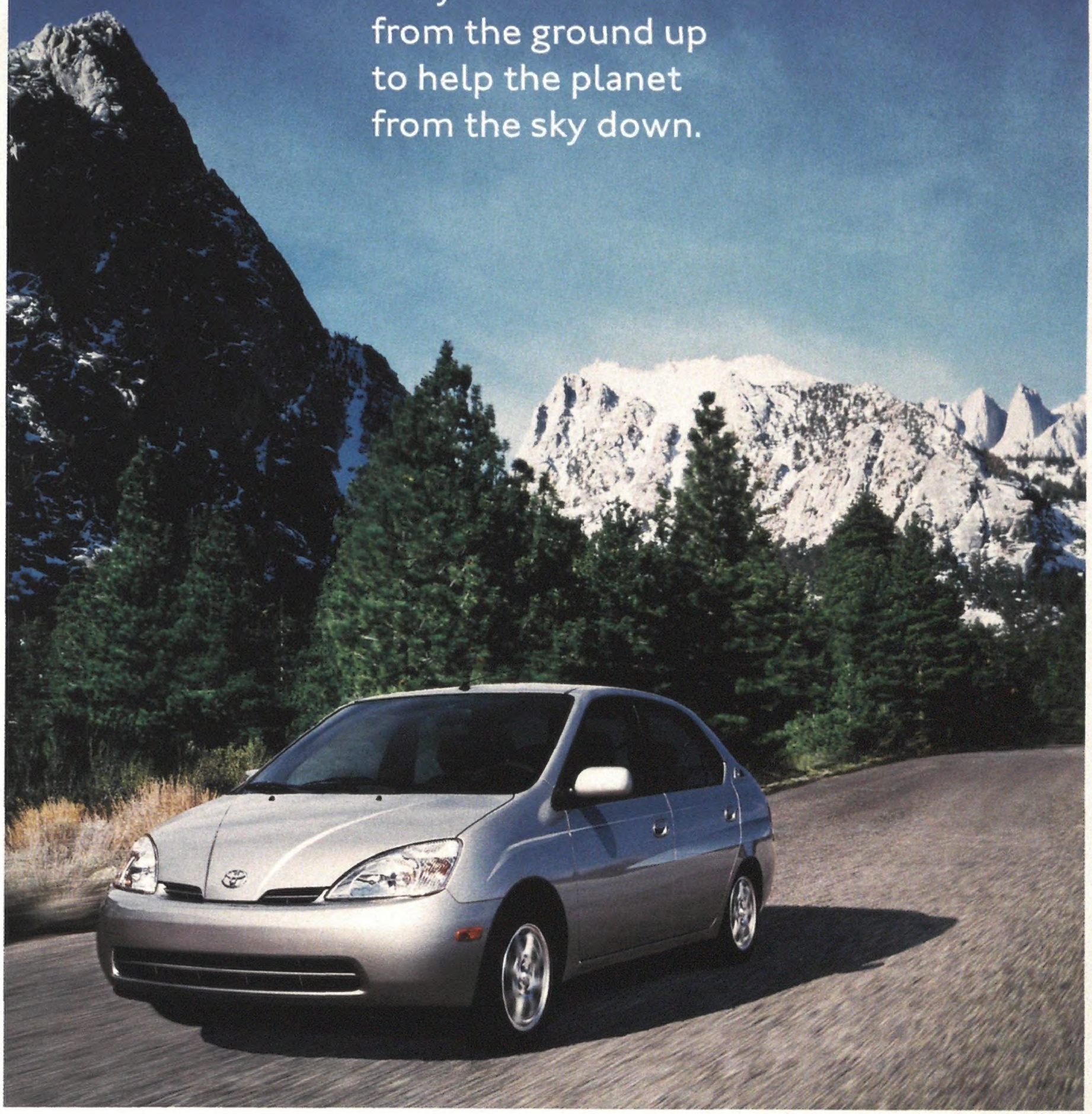

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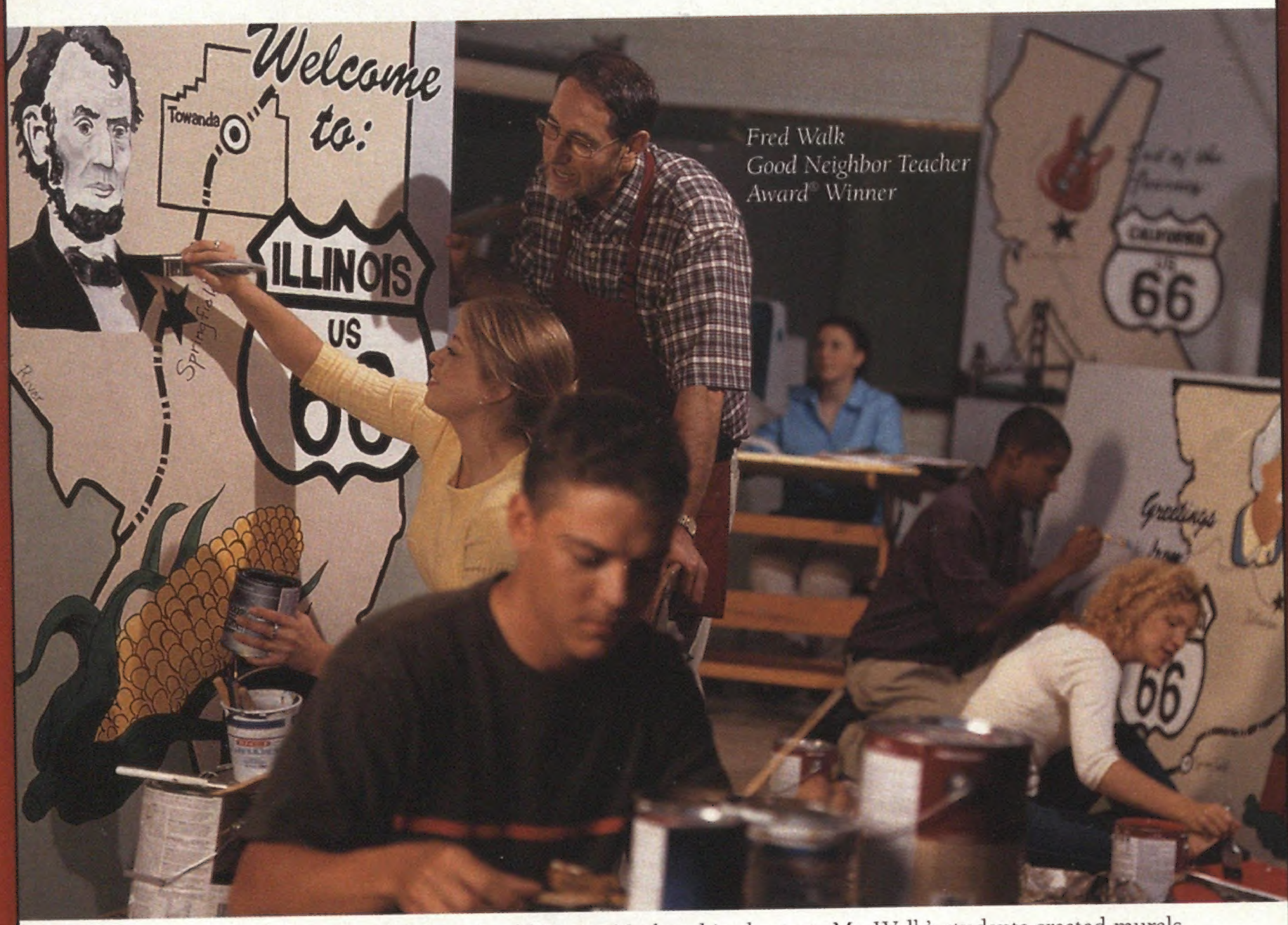

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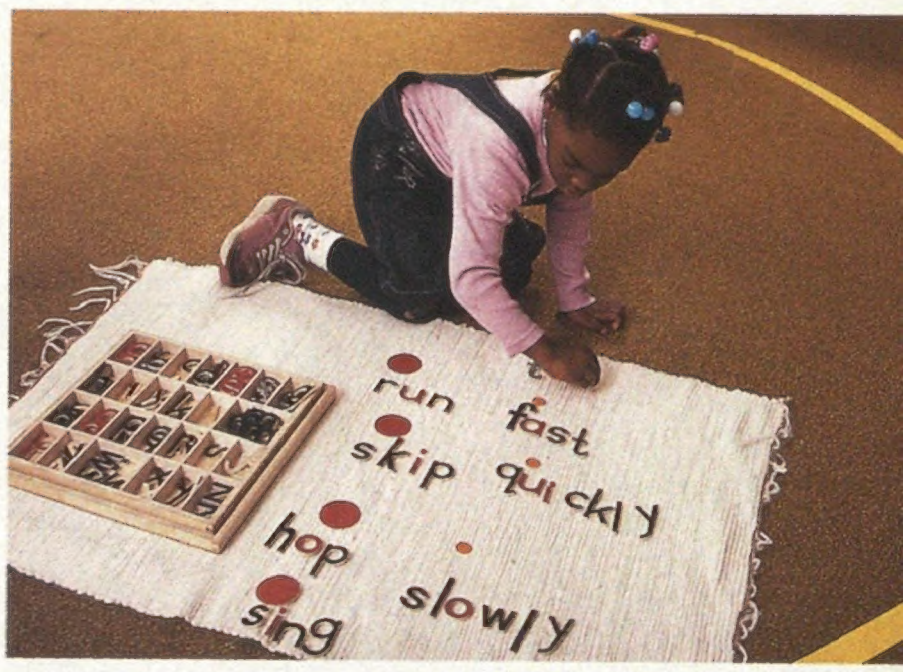

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From top: Baby orangutans have to learn to live in the wild; the "front door" to Venice; a Montessori student in Landover, Maryland. **COVER: Gondolas at St. Mark's basin, Venice. Photograph by Bob Krist.**

VIVIANE MOOS; BOB KRIST; KAY CHERNUSH

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George Divoky, Ph.D., *Researcher, Institute of Arctic Biology, University of Alaska*

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EDITOR'S

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Witnesses

SOME REPORTERS FIND THEMSELVES DRAWN TO STORIES ABOUT SURVIVAL

BY CAREY WINFREY

Ken Ringle: No longer worried.

FOR "UNCOMMON VALOR" (P. 46), KEN RINGLE interviewed Navy captain David M. Thomas in the Pentagon courtyard where the injured were first brought for treatment September 11. Thomas told Ringle that whenever he needed bucking up in the days following the attack, he went to a special place. Ringle asked to see it, and Thomas led him to a fourth-floor Pentagon corridor where the walls were covered with notes and crayon drawings of American flags from children across the country. One in particular buoyed Thomas: "Dear American, I'm sorry that you got hurt. I am praying for you. I hope you feel better. Love, Christy. Age 4." Says Ringle of the reporting experience: "As the son, stepson and godson of highly decorated World War II Naval officers, I have found myself wondering in recent years whether today's Navy produces the same extraordinary caliber of people. After interviewing Hanson, Thomas and Tarantino, I no longer worry."

VIVIANE MOOS IS ALSO DRAWN TO STORIES OF SURVIVAL. SHE SPENT SEVERAL weeks in Indonesia photographing orangutans, which appear headed for extinction in the wild because of poaching and destruction of their natural habitat ("No Exit," p. 62). The first two orangutans she met were babies at a friend's house on the grounds of the Jakarta zoo. "They ran around in Pampers and loved to cling to me," she says. "I learned to photograph with one of them sitting on my foot, holding on to my leg as I walked, or even balanced on my hip."

She then traveled to the island of Borneo, where rescued toddler orangutans live in a protected area. When they saw Moos, they came down from the small trees they were learning to climb. "They love to be tickled," she says. "They would laugh and squirm and laugh some more. They also love to bite. They bite each other in play, so they want to bite humans, too, but it can be quite painful." In a Borneo forest, where orangutan rescuers release adult animals into the wild, she was told not to get her hopes up; one researcher had been there for four months without seeing even a single orangutan. But after only three hours of hiking, Moos spotted a 15-year-old male known to researchers as Dodoi, who had been released in 1992.

He was sitting regally, high in a tree. "Because I could not get a good photograph of him where he was, I climbed up on a terrace and spoke to him in English," she says. "'Dodoi,' I called out, 'would you please move over to that tree so I can photograph you?' I pointed at the tree. He watched me for a minute, then slowly swung his way over to where I had pointed—I swear this is the truth—and proceeded to pose."

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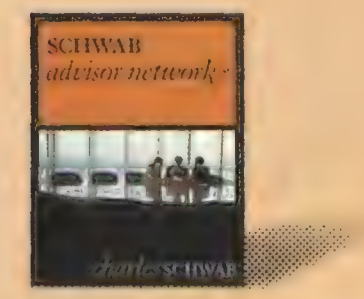

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Pursuing Perfection

FROM THE SECRETARY

WHY NOT PERFECTION? THAT THOUGHT DIDN'T MERELY cross the mind of American connoisseur Charles Lang Freer (1854-1919) when he was assembling his great collection of art; it took up permanent residence there. Freer was passionate about Asian art and about the art of a small number of contemporary American painters. He believed that an aesthetic spirit unconstrained by time or geography breathed over the disparate Asian and American objects and made them a whole. When Freer offered his collection to the Smithsonian in 1904, the Regents were reluctant to accept it. Was it appropriate to what was still an overwhelmingly scientific enterprise? They ended their hesitation early in 1906, after the urging of no less a figure than President Theodore Roosevelt. Some 60 years after the Smithsonian was established, it had its first art museum.

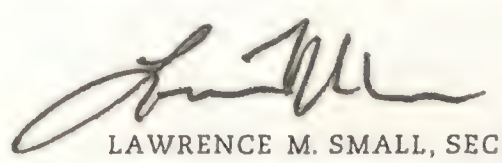
Unconstrained by time: a detail of a screen by Tawaraya Sotatsu.

Freer spent the remaining 13 years of his life enhancing the collection. He wanted the beauty and harmony of his objects to be conveyed within a comparably harmonious physical setting, and, as if to demonstrate yet again how a common aesthetic can link diverse cultures, he asked his architect, Charles Platt, to design an Italian Renaissance-style building to house the Asian and American art. Platt conceived a magnificent granite structure on a site adjacent to the Smithsonian Castle (which he was apparently told would one day be razed). The Freer Gallery opened on the National Mall in 1923 and, after a major renovation in the 1990s, is as beautiful today as it was when new.

Freer initially imposed stern restrictions on his gift. After his death, the collection was neither to grow nor be diminished, nothing was to be lent to other museums, and objects from elsewhere were not to be shown in the museum. (Such limitations are understandable if you believe you have made something perfect.) When he was subsequently persuaded that a great deal of Asian art worthy of inclusion remained to be discovered, he allowed additions to the Asian portion. But he held the line on the American—and, for his sake, was probably wise to do so. He would have had little sympathy for the revolutionary modernist aesthetic that was already taking hold in his lifetime.

The Smithsonian opened a second museum of Asian art in 1987, the Arthur M. Sackler Gallery, physically linked to the Freer but with its own collections—and without the Freer's restrictions on lending or exhibiting objects. In May we had the great good fortune to welcome a new director of the Freer and Sackler, Julian Raby, formerly a member of the Faculty of Oriental Studies at the University of Oxford, who brings us a remarkable range of experience as scholar, curator, teacher and publisher. He is determined to use the complementary strengths of the two museums to win new audiences for Asian art. "We must ally our traditions for research and scholarship with a dynamic policy for hosting exhibitions, even as we make our own treasures widely available to the American public," he says. "In all that we do, we must strive to live up to the responsibility of the imposing title that has been conferred on our two galleries: the national museum of Asian art."

But no matter how ambitious the national museum's lending policy, a marvelous representation of Asian art—bronzes, jades, screens, scrolls, ceramics, paintings, metalwork and more—can never leave Freer's ideal museum. The gallery's Asian holdings are now three times as numerous as they were at Freer's death, and are preeminent in the world. The additions have been chosen by curators and scholars whose meticulous research is as essential for seeing the objects clearly as is the carefully filtered light in which they are displayed. Freer died without seeing his museum completed, but he would surely have been pleased with it. Surrounded by its treasures, in a setting that envelops you in the spirit of the art, you cannot help but conclude that when he took aim at perfection, Charles Freer hit his impossible mark.



LAWRENCE M. SMALL, SECRETARY

FREER GALLERY OF ART, SI GIFT OF CHARLES LANG FREER

For more than 30 years, the UPS Community Internship Program has taught some surprising lessons. Just ask Jim Winestock. As a rising executive, he was sent to rural Tennessee to enhance his management skills. He worked in a soup kitchen, volunteered at a police department and helped a poverty-stricken family build a home. It was a different Jim Winestock who returned to UPS a month later. One who could easily relate to all kinds of people. Not just on a professional level, but on a human one. To hear Jim tell it, that will make anybody a better manager.

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JIM WINESTOCK.

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Readers respond to the July issue.

SAVE THE DOLPHINS

"INCIDENT AT BIG PINE KEY" REDUCES the story of marine mammal rescue to a petty squabble among a few grandstanders who have built careers exploiting the public's sympathy for dolphins. For all the grand talk of "rescuing," the data show that most stranded marine mammals are simply too far gone to save. The story should have focused on the unsung volunteers, trainers and veterinarians who go all out for what is usually a lost cause, hoping each time maybe they'll save a beautiful animal's life.

Edwin Gardner
Charleston, South Carolina

RISKY AND USUALLY FUTILE HEROIC attempts to rescue dolphins from their own self-destruction do not make sense. The real answer to the problem of stranded dolphins is more scientific research into why this happens.

Michael Kiley
Crestwood, Illinois

ASSESSING HEYERDAHL

HAD THE AUTHOR OF "KON ARTIST?" carefully read what Thor Heyerdahl had written about the *Kon-Tiki* expedition, he would have known that Heyerdahl did not claim to have proved any transoceanic migration theories with his expeditions. Dr. Heyerdahl was not afraid to ask questions that were outside the established boundaries of academia. He always used to tell me that unless he asked the questions, nobody would research the problem. He was willing to risk demonstrating what could have been [for example, by successfully voyaging in the *Kon-Tiki* from Peru to French Polynesia]. Yet he maintained his theories not because he had "proved" them but because he had demonstrated that events could have happened that way.

J. Bjørnar Storfjell, PhD
The Thor Heyerdahl Research Centre
Aylesbury, United Kingdom

THREE CHEERS FOR THE ARTICLE BY Richard Conniff, a much-needed corrective to decades of increasingly preposterous Heyerdahlian "discoveries" and "theories." Following my excava-

tions in the Marquesas, I devoted a chapter of my 1960 book, *Island Civilizations of Polynesia*, to the *Kon-Tiki* myth, citing the obviously fraudulent Easter Island cave sculptures [which Heyerdahl wrote about]. At that time, little was known about their manufacture, but Conniff has since filled in the gap.

Robert C. Suggs
Boise, Idaho

ARMED RESISTANCE

"AGAINST ALL ODDS," ABOUT THE black activist Ida B. Wells, who died at age 68 in 1931, left out the important fact that she encouraged black resistance to lynching, saying that a "Winchester rifle should have a place of honor in every black home." Wells advocated effective, and armed, self-help, not just white boycotts and black flight.

Paul H. Blackman, PhD
Arlington, Virginia

MIMICRY OR MOCKERY?

I WAS DISAPPOINTED TO LEARN IN "Second Nature" of a biotechnology firm's efforts to harvest spider silk from goat's milk. It is one thing to mimic nature; it is quite another to exploit it for money. To cross-pollinate plants to create a superior strain is noble and safe. To genetically alter a goat is the sort of biotechnical Frankenstein that causes people like me to cringe.

Paul Coblentz
Scottsdale, Arizona

YOUR ARTICLE DEMONSTRATES THAT nature is an endlessly fascinating storehouse of wonders for us to explore. It is also a lesson in humility. With all our ingenuity, humanity can only observe, select and rearrange what is in nature.

Michael Landau
Rome, New York

COLD COMFORT

JOHN GORRIE, INVENTOR OF THE ICE machine ("Chilly Reception"), is not forgotten. A statue of him is in the U.S. Capitol, and Apalachicola boasts the John Gorrie Museum and bridge.

Harold Faber
Salisbury, Connecticut

Send letters for this column to LettersEd@simag.si.edu or to **Letters Editor, SMITHSONIAN, MRC 951, P.O. Box 37012, Washington, D.C. 20013-7012.** Please include your telephone number and address. Letters may be edited for clarity and length. Send queries and comments about the Smithsonian Institution to info@info.si.edu or to VIARC, Public Inquiry Mail Service, P.O. Box 37012, Washington, D.C. 20013-7012.

Cattle aren't actually everywhere in Texas. Bulls just can't hit the high notes.
Some might think that the sounds of Texas are limited to moos and whinnies. Well, if you're one of them, consider yourself personally invited to enjoy an evening of fine or performing art in one of Texas' countless symphony halls and theaters. It's the perfect end to a day of shopping, golf, museums, or all the other activities we have for your trip to Texas. You can even still see longhorns, just probably not onstage. They tend to distract the woodwinds. Visit www.TravelTex.com or call 1-800-8888-TEX (ext. 2555) for a free 264-page Texas State Travel Guide, Accommodations Guide, and Texas Highway Map.
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Of her thousands of photographs, Marion Post Wolcott's favorite was the 1939 image above.

Mississippi Moment

BY PAUL HENDRICKSON

INDELIBLE IMAGES

IT WAS JUST A SECOND IN ETERNITY, A SILhouetted and slightly stooped black man in a fedora and blousy coat entering a segregated movie house by an outside staircase on a Saturday afternoon in October 1939, deep in the Mississippi Delta, so that he might relieve his spirit—and possibly his arches—while cowboy hero Bob Steele flicked off Winchester fire at bad men. The photographer saw the scene, framed it in her sensibility, and clicked—or this is how one likes to imagine it, anyway.

Marion Post, who had been a photographer at the Philadelphia *Evening Bulletin*, was 29 and in the employ of Franklin Delano Roosevelt's Farm Security Administration, part of that great, itinerant, federal corps of documentarians (among them Walker Evans, Dorothea Lange, Gordon Parks and Ben Shahn) whose mission was to create a visual record of Depression-ravaged America. Post was among the greatest of those now mythic government-sponsored artists, and yet we don't know her the way we know some of the others. Why? Because she did her lonely, courageous work for barely three years. And then she married Lee Wolcott, a federal agriculture official, and put the camera down and moved to a farm in Virginia and began raising a family. For all artistic intents and purposes, she disappeared. She died in 1990, at age 80.

Marion Post Wolcott produced thousands of photographs for the Farm Security Administration, and of her

MARION POST WOLCOTT/LIBRARY OF CONGRESS

Signs of the past are painted over today at the Belzoni theater (above). Marion Post Wolcott (right, in Vermont in 1940) died in 1990 at the age of 80.

work that day in Belzoni, the Library of Congress in Washington, D.C. holds 25 prints and their negatives. Number 18 bears the prosaic caption, written by Wolcott: "A Negro going in the Entrance for Negroes at a movie theater, Belzoni, Mississippi, 1939." The photograph has hung in the Museum of Modern Art in New York City, among many important venues, and remains a striking example of what that museum's former director of photography John Szarkowski once called "the poetic use of bare facts, facts presented with such fastidious reserve that the quality of the picture seemed identical to that of the subject." Wolcott herself once described the photograph as her favorite: "I think it says the most about me, about what I was trying to do and trying to say."

Wolcott went to tiny Belzoni on that long-ago autumn Saturday in a top-down Plymouth Six with her Speed Graphic and Rolleiflex and Leica cameras, with her amazing eye, with her cheeky wit and indefatigable energy. The horse opera at the Crescent Theatre was *Feud of the Range,* as announced in the poster box below the big painted-on Dr. Pepper ad with its curious promise, "Good for Life!"

From all available evidence, she didn't note the name of the moviegoer. You can't make out his face, but he seems to be slightly turning toward the photographer (who is possibly 30 paces off, standing in the middle of the street) as if to ask: "*Why, ma'am, would you wish to take a picture of something as ordinary as this, as ordinary as me?*" In that time-fraction of mutual recognition, she must have seen three great swaths of our cultural history: cowboy dreams, racial bigotry, and the pot of gold (a $400 door prize) at the end of the rainbow.

I first saw Belzoni, first stood outside that Delta picture show—which still is a Delta picture show—15 years ago, on a sweltering summer Saturday in 1987. I was writing about Wolcott for the *Washington Post* (I later expanded the piece into a book), and although I had spent several days with her and her husband in California, it felt romantically and extravagantly necessary to go and stand in the approximate places where she had once stood.

The outside staircase was still there, but it didn't lead anywhere, legal segregation being long gone in Mississippi. The brick wall was painted over—all white—and yet you could make out traces of something underneath. The town librarian, when I showed her the photograph (she hadn't seen it), said something that goose-bumped me. "Practically every time after we've had a hard rain, that old Dr. Pepper ad, you know, well, it starts to come back through, just a little, underneath all that paint. Yessir, just when the paint begins to dim, it comes right back through." Pentimento. The things that were, will come back, maybe to haunt you. You can bolt the door at the top of an old staircase, you can whitewash or paint over the wall of brick where a charming soft drink ad once was. But bitter legacies of earlier histories will not so easily be erased, painted over, dead-bolted.

Last June, I traveled to Belzoni again. I got there one night when the theater was dark. The place was now the New Crescent Theatre. *The Scorpion King* and *Changing Lanes* were on the bill for the weekend. I stood around for an hour or more, feeling like an outsider, feeling thrilled. It was so hot, so still. A couple of African-American kids careered by on bikes, stirring me from my drowse. A dog on another block yelped. I walked 20 or 30 paces off from the wall and squinted through an imaginary box. I looked up at the brick wall. I thought: *there's nothing to see except whiteness*. I looked more carefully. Faint lines of black were showing through the cracks. Last time, I'd been able to make out more of the pentimento. Somehow, I thought, this is progress.

I walked up the stairs and tried my hand on the bolted door. It wouldn't give. I started back down. On a middle step, there was a bottle cap. I turned it over and saw a soft blue with the words "Bud Ice." I know it is foolishly romantic, but, 63 years after Wolcott stood there and stopped time in a box, I wanted to imagine two love-struck teens, one white, one black, sitting on a worthless staircase sharing an after dark, illicit, cooling drink of Bud Ice.

Paul Hendrickson is the author of Looking for the Light: The Hidden Life and Art of Marion Post Wolcott.

GIB FORD; ARTHUR ROTHSTEIN/LIBRARY OF CONGRESS

I thought diet and exercise were enough to lower my cholesterol. Turned out I needed more.

Now I take my family history of high cholesterol and heart disease a lot more seriously. Because even though I was doing everything right, my cholesterol was still too high, and I had a heart attack. As I was recovering, I asked my doctor about adding ZOCOR. He said ZOCOR, along with a healthy diet and exercise, could really lower cholesterol. And it's working. Now my cholesterol is right where it should be. And so am I.

ZOCOR is an effective medicine that along with diet and exercise can significantly lower total cholesterol. A clinical study among people with high cholesterol and heart disease found 42% fewer deaths from heart attack among those taking ZOCOR.* One tablet, taken once a day, can help people with high cholesterol and heart disease live longer, healthier lives.

Important considerations: ZOCOR is a prescription medicine and isn't right for everyone, including women who are nursing or pregnant or who may become pregnant, anyone with liver problems, and people who are allergic to any ingredients of ZOCOR. Unexplained muscle pain or weakness could be a sign of a rare but serious side effect and should be reported to your doctor right away. Your doctor may do blood tests before and during treatment with ZOCOR to check for liver problems. To avoid serious side effects, discuss with your doctor medicine or food you should avoid while on ZOCOR (see details immediately following this ad).

Ask your doctor if ZOCOR is right for you. For more information and the free *Guide for Managing High Cholesterol*, call 1-888-MERCK-68 or visit zocor.com.

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*42% reduction based on 111/2,221 (ZOCOR) vs 189/2,223 (placebo).

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USES OF ZOCOR

ZOCOR is a prescription drug that is indicated as an addition to diet for many patients with high cholesterol when diet and exercise are inadequate. For patients with coronary heart disease (CHD) and high cholesterol, ZOCOR is indicated as an addition to diet to reduce the risk of death by reducing coronary death; to reduce the risk of heart attack; to reduce the risk for undergoing cardiac procedures (coronary artery bypass grafting and percutaneous transluminal coronary angioplasty); and to reduce the risk of stroke or transient ischemic attack (TIA).

WHEN ZOCOR SHOULD NOT BE USED

Some people should not take ZOCOR. Discuss this with your doctor.

ZOCOR should not be used by patients who are allergic to any of its ingredients. In addition to the active ingredient simvastatin, each tablet contains the following inactive ingredients: cellulose, lactose, magnesium stearate, iron oxides, talc, titanium dioxide, and starch. Butylated hydroxyanisole is added as a preservative.

Patients with liver problems: ZOCOR should not be used by patients with active liver disease or repeated blood test results indicating possible liver problems. (See WARNINGS.)

Women who are or may become pregnant: Pregnant women should not take ZOCOR because it may harm the fetus. **Women of childbearing age should not take ZOCOR unless it is highly unlikely that they will become pregnant.** If a woman does become pregnant while on ZOCOR, she should stop taking the drug and talk to her doctor at once.

Women who are breast-feeding should not take ZOCOR.

WARNINGS

Muscle: Tell your doctor right away if you experience any unexplained muscle pain, tenderness, or weakness at any time during treatment with ZOCOR so your doctor can decide if ZOCOR should be stopped. Some patients may have muscle pain or weakness while taking ZOCOR. Rarely, this can include muscle breakdown resulting in kidney damage. The risk of muscle breakdown is greater in patients taking certain other drugs along with ZOCOR:

- **Cyclosporine, itraconazole, ketoconazole, erythromycin, clarithromycin, HIV protease inhibitors, the antidepressant nefazodone, or large quantities of grapefruit juice (>1 quart daily), particularly with higher doses of ZOCOR.**
- **Gemfibrozil, other fibrates, or lipid-lowering doses (≥1 g/day) of niacin, particularly with higher doses of ZOCOR.**
- **Amiodarone or verapamil with higher doses of ZOCOR.**

The risk of muscle breakdown is greater at higher doses of simvastatin.

Because the risk of muscle side effects is greater when ZOCOR is used with the products listed above, the combined use of these products should be avoided unless your doctor determines the benefits are likely to outweigh the increased risks.

If your doctor determines that the benefits of combined use of ZOCOR with gemfibrozil, other fibrates, or niacin likely outweigh the increased risk of muscle problems, the dose of ZOCOR should not exceed 10 mg daily. No more than 10 mg/day of ZOCOR should be taken with cyclosporine.

The combined use of verapamil or amiodarone with doses above ZOCOR 20 mg should be avoided unless your doctor determines the benefits outweigh the increased risk of muscle breakdown.

Your doctor should also carefully monitor for any muscle pain, tenderness, or weakness, particularly during the initial months of therapy and if the dose of either drug is increased. Your doctor also may monitor the level of certain muscle enzymes in your body, but there is no assurance that such monitoring will prevent the occurrence of severe muscle disease.

The risk of muscle breakdown is greater in patients with kidney problems or diabetes.

If you have conditions that can increase your risk of muscle breakdown, which in turn can cause kidney damage, your doctor should temporarily withhold or stop ZOCOR. Also, since there are no known adverse consequences of briefly stopping therapy with ZOCOR, treatment should be stopped a few days before elective major surgery and when any major acute medical or surgical condition occurs. Discuss this with your doctor, who can explain these conditions to you.

Liver: About 1% of patients who took ZOCOR in clinical trials developed elevated levels of some liver enzymes. Patients who had these increases usually had no symptoms. Elevated liver enzymes usually returned to normal levels when therapy with ZOCOR was stopped.

In the ZOCOR Survival Study, the number of patients with more than 1 liver enzyme level elevation to greater than 3 times the normal upper limit was no different between the ZOCOR and placebo groups. Only 8 patients on ZOCOR and 5 on placebo discontinued therapy due to elevated liver enzyme levels. Patients were started on 20 mg of ZOCOR, and one third had their dose raised to 40 mg.

Your doctor should perform routine blood tests to check these enzymes before you start treatment with ZOCOR and periodically thereafter (for example, semiannually) for your first year of treatment or until 1 year after your last elevation in dose. Patients titrated to the 80-mg dose should receive an additional test at 3 months. If your enzyme levels increase, your doctor should order more frequent tests. If your liver enzyme levels remain unusually high, your doctor should discontinue your medication.

Tell your doctor about any liver disease you may have had in the past and about how much alcohol you consume. ZOCOR should be used with caution in patients who consume large amounts of alcohol.

PRECAUTIONS

Before starting treatment with ZOCOR, try to lower your cholesterol by other methods such as diet, exercise, and weight loss. Ask your doctor about how best to do this. Any other medical problems that can cause high cholesterol should also be treated.

Drug Interactions: Because of possible serious drug interactions, it is important to tell your doctor what other drugs you are taking, including those obtained without a prescription. You should also tell other doctors who are prescribing a new medicine for you that you are taking ZOCOR® (simvastatin).

ZOCOR can interact with the following:

- Itraconazole
- Ketoconazole
- Erythromycin
- Clarithromycin
- HIV protease inhibitors
- Nefazodone
- Cyclosporine
- Large quantities of grapefruit juice (>1 quart daily)

The risk of myopathy is also increased by the following lipid-lowering drugs that can cause myopathy when given alone:

- Gemfibrozil
- Other fibrates
- Niacin (nicotinic acid) (≥1 g/day)

The risk of muscle breakdown is increased with other drugs:

- Amiodarone
- Verapamil

Some patients taking lipid-lowering agents similar to ZOCOR and coumarin anticoagulants (a type of blood thinner) have experienced bleeding and/or increased blood clotting time. Patients taking these medicines should have their blood tested before starting therapy with ZOCOR and should continue to be monitored.

Central Nervous System Toxicity; Cancer, Mutations, Impairment of Fertility: Like most prescription drugs, ZOCOR was required to be tested on animals before it was marketed for human use. Often these tests were designed to achieve higher drug concentrations than humans achieve at recommended dosing. In some tests, the animals had damage to the nerves in the central nervous system. In studies of mice with high doses of ZOCOR, the likelihood of certain types of cancerous tumors increased. No evidence of mutations of or damage to genetic material has been seen. In 1 study with ZOCOR, there was decreased fertility in male rats.

Pregnancy: Pregnant women should not take ZOCOR because it may harm the fetus.

Safety in pregnancy has not been established. In studies with lipid-lowering agents similar to ZOCOR, there have been rare reports of birth defects of the skeleton and digestive system. Therefore, women of childbearing age should not take ZOCOR unless it is highly unlikely they will become pregnant. If a woman does become pregnant while taking ZOCOR, she should stop taking the drug and talk to her doctor at once. The active ingredient of ZOCOR did not cause birth defects in rats at 3 times the human dose or in rabbits at 3 times the human dose.

Nursing Mothers: Drugs taken by nursing mothers may be present in their breast milk. Because of the potential for serious adverse reactions in nursing infants, a woman taking ZOCOR should not breast-feed. (See WHEN ZOCOR SHOULD NOT BE USED.)

Pediatric Use: ZOCOR is not recommended for children or patients under 20 years of age.

Geriatric Use: Higher blood levels of active drug were seen in elderly patients (70–78 years of age) compared with younger patients (18–30 years of age) in 1 study. In other studies, the cholesterol-lowering effects of ZOCOR were at least as great in elderly patients as in younger patients, and there were no overall differences in safety between elderly and younger patients over the 20–80 mg/day dosage range.

SIDE EFFECTS

Most patients tolerate treatment with ZOCOR well; however, like all prescription drugs, ZOCOR can cause side effects, and some of them can be serious. Side effects that do occur are usually mild and short-lived. Only your doctor can weigh the risks versus the benefits of any prescription drug. In clinical studies with ZOCOR, less than 1.5% of patients dropped out of the studies because of side effects. In a large, long-term study, patients taking ZOCOR experienced similar side effects to those patients taking placebo (sugar pills). Some of the side effects that have been reported with ZOCOR or related drugs are listed below. This list is not complete. Be sure to ask your doctor about side effects before taking ZOCOR and to discuss any side effects that occur.

Digestive System: Constipation, diarrhea, upset stomach, gas, heartburn, stomach pain/cramps, anorexia, loss of appetite, nausea, inflammation of the pancreas, hepatitis, jaundice, fatty changes in the liver, and, rarely, severe liver damage and failure, cirrhosis, and liver cancer.

Muscle, Skeletal: Muscle cramps, aches, pain, and weakness; joint pain; muscle breakdown.

Nervous System: Dizziness, headache, insomnia, tingling, memory loss, damage to nerves causing weakness and/or loss of sensation and/or abnormal sensations, anxiety, depression, tremor, loss of balance, psychic disturbances.

Skin: Rash, itching, hair loss, dryness, nodules, discoloration.

Eye/Senses: Blurred vision, altered taste sensation, progression of cataracts, eye muscle weakness.

Hypersensitivity (Allergic) Reactions: On rare occasions, a wide variety of symptoms have been reported to occur either alone or together in groups (referred to as a syndrome) that appeared to be based on allergic-type reactions, which may rarely be fatal. These have included 1 or more of the following: a severe generalized reaction that may include shortness of breath, wheezing, digestive symptoms, and low blood pressure and even shock; an allergic reaction with swelling of the face, lips, tongue, and/or throat with difficulty swallowing or breathing; symptoms mimicking lupus (a disorder in which a person's immune system may attack parts of his or her own body); severe muscle and blood vessel inflammation, sometimes including rash; bruises; various disorders of blood cells (that could result in anemia, infection, or blood clotting problems) or abnormal blood tests; inflamed or painful joints; hives; fatigue and weakness; sensitivity to sunlight; fever, chills; flushing; difficulty breathing; and severe skin disorders that vary from rash to a serious burn-like shedding of skin all over the body, including mucous membranes such as the lining of the mouth.

Other: Loss of sexual desire, breast enlargement, impotence.

Laboratory Tests: Liver function test abnormalities including elevated alkaline phosphatase and bilirubin; thyroid function abnormalities.

NOTE: This summary provides important information about ZOCOR. If you would like more information, ask your doctor or pharmacist to let you read the prescribing information and then discuss it with them.

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20203255(1)(442C)-ZOC-CON

Photojournalist Bill Biggart's grit-encrusted cameras and film were found near his body in the Twin Towers rubble.

CHIP EAST/SIPA PRESS

Bearing Witness to September 11

AROUND THE MALL

THE STORIES ARE TO BE FOUND EVERYwhere, in lives lost and lives spared, filtered through lenses, written in diaries. Relayed in broadcasts and recounted in newspapers, scorched onto a piece of Indiana limestone that once ornamented the facade of the Pentagon. Worked into the harness of a New York State Police K9 dog, named Theo, assigned to Ground Zero. Buried in the rubble with the cameras of photojournalist Bill Biggart, who lost his life documenting the disaster; preserved in the shoes of Maria Cecilia Benavente, who removed her sandals to hasten her descent from the South Tower; twisted into the steel columns that once girded each of the Twin Towers. The stories are embedded in our memories and imprinted on our world.

They are the stories of September 11, chronicles of heroism and terror, rescue and recovery. And they are ours, to be remembered and preserved. And to signify a day when four airplanes rendered all too real what had hitherto been inconceivable: two skyscrapers, gone, a green field near Shanksville, Pennsylvania, gouged, a portion of the Pentagon, gutted. And lives given over—some briefly and some forever—to one day and its aftermath.

Out of that collective experience, curators at the Smithsonian's National Museum of American History (NMAH) have shaped an exhibition intended neither to

Photographer Biggart shot his final image, of the South Tower in ruins, seconds before the North Tower collapsed and killed him.

explain nor to analyze—it is still too soon for that—but to commemorate.

"September 11: Bearing Witness to History," which opens on the one-year anniversary and closes four months later, presents personal and public narratives, conveyed in word, image and artifact.

The introductory images in this 5,000-square-foot exhibition are not of the Twin Towers, nor the Pentagon, nor the crash site near Shanksville—those photographs appear subsequently. But first, the witnesses: people watching and reacting to those disasters, hands over their mouths, horror on their faces. The second of the exhibition's six sections highlights the work of four photographers at the three crash sites—including several of Biggart's final photographs. Next, some 50 artifacts—only a portion of the museum's growing collection of 9/11 material—constitute the heart of the exhibition. The items offer their own evocative testimony: three airplane fragments; the crushed door from a New York fire department truck; a Twin Towers elevator emergency-instruction plate; the gloves, hard hat, tools and belt worn and used by steelworker Jim Connor, who arrived at Ground Zero on September 12 and worked through February with the rescue and recovery effort. A briefcase. A baseball cap. And, from the Pentagon, the uniforms worn by two Naval officers who entered the burning building to search for survivors (see "Uncommon Valor," p. 46). "Perfectly ordinary, everyday objects we might otherwise not collect," says NMAH museum specialist David Shayt, "except for the extraordinary nature of their context."

The role of the news media is presented in two of the sections: a first-person video account from ABC news anchor Peter Jennings and a computer-generated video montage of headlines, front pages and stories from around the world. In the next to last gallery, 25 personal stories are offered on five interactive computer monitors. Finally, in a space furnished with tables and chairs, cards, pens, and telephones equipped with voice recorders, visitors are invited to contribute their own stories to a digital archive by answering two questions: "How did you witness history on September 11?" and "Has your life changed?"

"With my cameras," Bill Biggart, 30 years a photographer, might have answered the first question. But his determination to witness history—to shoot the story—cost him his life. On that morning, sometime between the collapse of the South and the North towers, Biggart had spoken by cell phone with his wife, Wendy Doremus. "I'm OK," he reassured her, "I'm with the firemen." He added that he would head for home shortly.

Cecilia Benavente escaped Tower Two barefoot; in shock, she held onto her sandals.

A door from a fire truck of Brooklyn's Squad Company 1: ten squad members died that day.

Biggart was the only professional photographer to die on the job that day, crushed under the rubble of the fallen North Tower. When his body was recovered four days later, so, too, were his three cameras, film cartridges, press credentials and other equipment. Several of these items, on loan from his widow, appear in the exhibition: the edges of Biggart's laminated press ID tags are charred. A Canon digital camera, stripped of its lens and back cover, is blanched with ash and concrete dust and suffused with the smell of smoke.

Miraculously, more than 150 images were retrieved from the memory card in Biggart's Canon. The photographs not only docu-

BILL BIGGART; HUGH TALMAN/NATIONAL MUSEUM OF AMERICAN HISTORY, S1 (2)

ment the disaster as it erupted around him but also record the last moments of his life. There is a darkened view of the Marriott Hotel ruptured in two, a tri-pronged fragment of the honeycombed facade from the South Tower, and a wall of smoke, looming over the wreckage. That final frame is time-stamped just seconds before the North Tower collapsed above him.

A four-foot section of steel column was contorted by the force of Tower Two's collapse.

"HAS YOUR LIFE CHANGED?"

How hasn't Maria Cecilia Benavente's life changed? Recently, she packed up the black shoes, black knit skirt and yellow sweater she wore that morning, along with a pair of flip-flops she borrowed later that day, and mailed them to the Smithsonian. Her story, however, is not so easily relinquished.

She survived, but 176 of her fellow employees at Aon Risk Services did not. She has borne the survivor's burden of bearing witness.

She remembers . . . a cup of coffee, a glance out the window of her office on the 103rd floor of Two World Trade Center, a shocking sight: the other tower burning and her reflexive scream of "Get out! Get out!" A coworker shaking her, "What is the problem?" Pulling a fire alarm. No sound. Pulling another. No sound. Descending through the stairwell. Grabbing a friend's hand. People following behind her. Someone chastising her for moving too slowly. Too slowly! Stopping, then, on a landing and removing her cumbersome shoes—backless sandals with two-inch heels.

From the World Trade Center, she fled—barefoot, still clutching her shoes—to Brooklyn, with her coworker Maria Cafarelli. The women eventually reached the home of Cafarelli's parents in Queens. There, Benavente was given a pair of flip-flops for her swollen feet. "I went to Maria's mom's garden. I kept touching the tomatoes, the cucumbers," she would write in her journal. "I felt so lost, and touching the vegetables relaxed me."

In the aftermath of September 11, she moved from New York to Chicago, lost her sense of ambition, lost weight, lost pleasure in clothes. Gone are the skirts, including the narrow long one she had to pull up to the top of her thighs so she could take the broad strides needed to flee that day. Now she prefers trousers. Gone, too, are the fun, fashionable shoes. She favors low, comfortable footwear that can, she reports, "take her places rapidly."

Only two Twin Towers stairwell signs, including one from the 102nd floor, were ever recovered.

HUGH TALMAN/NMAH, SI (2)

BROKEN, DISTORTED, ITS welded seams torn asunder, this four-foot scrap of steel column is a mere fragment of the more than 650,000 feet of hollow box columns that girded the Twin Towers. "It evokes the incredible forces that were at work that day and explains why so little recognizable material survived. No doors, no desks, no computers," explains Shayt. "The incredible grinding action of tons and tons of steel—this little stub is but a reflection of these weights and masses of structural steel."

And yet, broken and diminutive, it has a heroic quality. "It held up," Shayt observes. "These box columns withstood the impact and saved lives as well. The load-bearing skin of the World Trade Center worked. The load was transferred for a blessed hour or so."

Displayed in the exhibit—waxed and available to be touched by visitors—the steel stub has, Shayt admits, its own personality. To study it, he says, is to meditate on something that is akin to the "stooped, bent shoulders of a Rodin sculpture—strong yet also sorrowful."

—*Victoria Dawson*

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PHENOMENA & CURIOSITIES

Happening Cats

STUDYING FELINE GENES HAS PAID OFF IN UNLIKELY WAYS, BOOSTING AIDS RESEARCH AND EVEN CRIMINAL FORENSICS

BY STEPHEN BUDIANSKY

"The feline genome project has been an ongoing passion of mine for the last 25 years," says O'Brien (in his lab, where blood and DNA from wild and domestic cats are frozen).

CHRIS HARTLOVE

THE HUMAN GENOME PROJECT, THE huge government-industry partnership to define the full complement of our genes is being conducted alongside a Noah's ark of similar endeavors. Scientists have already described in minute chemical detail all the genes in a number of "simple" species that are mainstays of laboratory research—yeast, several types of bacteria, a roundworm, and the fruit fly—and researchers are hot on the trail of other genomes, including those of the cow, rat and dog.

But perhaps the most unexpected genome sweepstakes so far is the probe of the house cat. The impetus for the work is an underappreciated genetic similarity between people and cats. Not that it's in our nature to chase mice or purr when scratched behind the ears, but scientists have found that when it comes to the arrangement of genes on our chromosomes, we're closer to cats than to any other animal group studied so far except primates.

That turns out to be useful. Parallels between human and cat genes may lead to new understandings of and treatments for diseases and may also shed light on some of the steps that evolution has taken to shape the two species in the 90 million or so years since cats, people and other mammals had a common ancestor. And cat genetics have already proved valuable in another, unexpected way: helping to solve a murder case.

A pioneer in feline genetics research is Stephen J. O'Brien, 57, a geneticist and chief of the National Cancer Institute's Laboratory of Genomic Diversity in Frederick, Maryland. He began studying the genetics of the house cat in the 1970s, then broadened his research to a variety of wild cats, from lions to pumas. The research has informed conservation efforts—pointing out that cheetahs were dangerously inbred, for instance—and shows promise of helping people, because wild cats, he says, have "natural genetic resistance to many of the same incurable diseases that afflict humans and fill our hospitals today."

The Cat Genome Project, which relies on contributions from other scientists as well as those in his lab, is a comprehensive genetic analysis of *Felis catus*, a.k.a. the common house cat, one of 37 cat species. (Obtaining DNA requires no more than a blood or saliva sample, O'Brien points out.) Analyzing the cat genome has already yielded insight into puzzling human diseases. House cats suffer from 200 genetically inherited disorders that also afflict people—including muscular dystrophy, polycystic kidney disorder and retinal degeneration—and scientists have pinpointed the specific genes in cats responsible for nine of these disorders.

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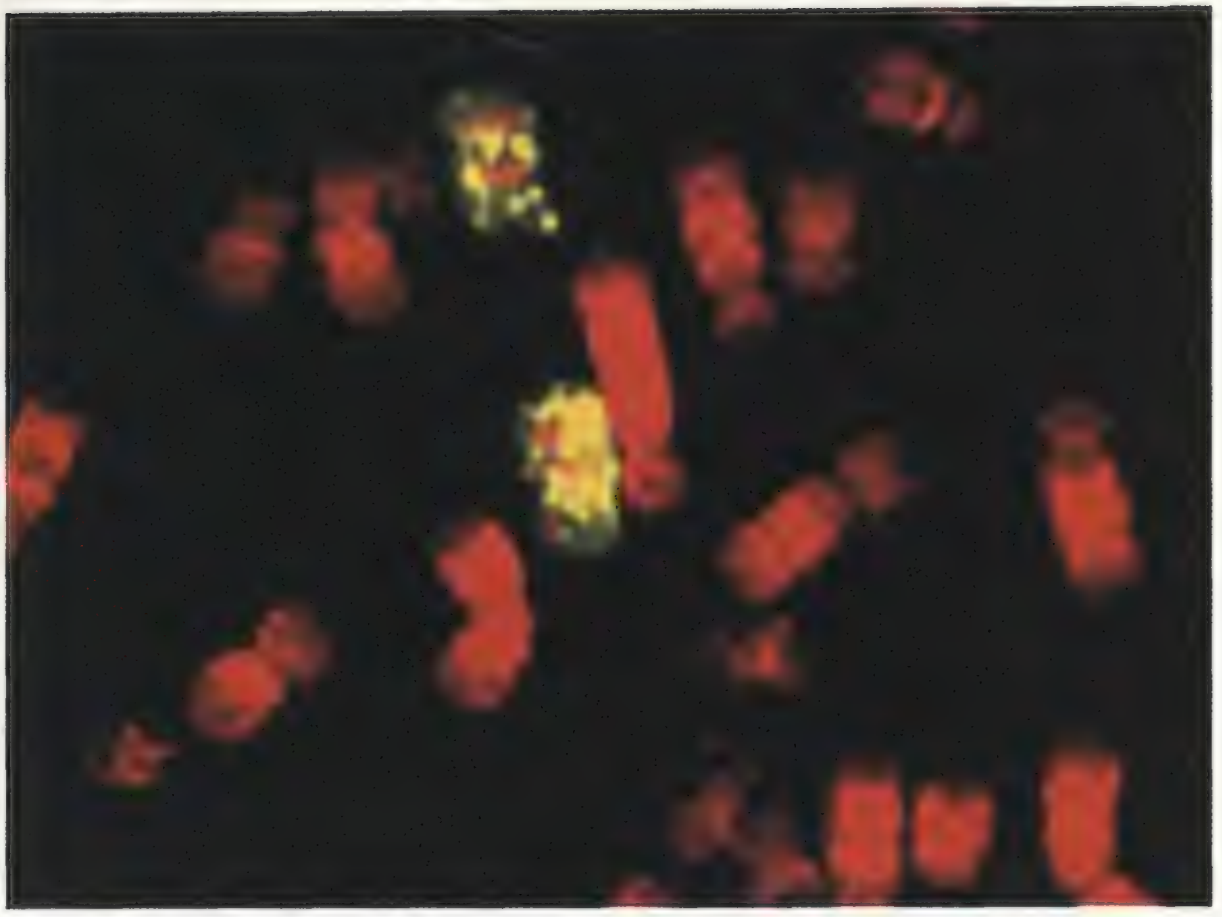

People and cats have more in common than is usually thought, as a study by O'Brien suggests: of the cat chromosomes (colored red, above), one reacted to a chemical probe for human chromosome 11, indicating a close match of human and feline DNA (yellow).

But the most striking disease research in O'Brien's lab concerns AIDS.

House cats develop a fatal AIDS-like syndrome after being infected by the feline immunodeficiency virus, or FIV, the cat version of the virus that causes AIDS. Yet lions and other wild cat species do not succumb to FIV, and therein lies a question: What do lions have in their defense systems that domestic cats lack? Perhaps, O'Brien speculated, those animals possess a gene or genes that help them resist the virus. Just posing the question led him and his colleagues to evidence of a rare human gene variant, dubbed CCR5, that appears to endow people who inherit it from both parents some resistance to the AIDS virus.

The CCR5 gene pair protects against infection, O'Brien says, by instructing the body to produce a protein that blocks the AIDS virus from invading cells. As it happens, medical researchers have been trying to invent new AIDS medications that accomplish much the same feat—and that research has been boosted by the CCR5 finding, O'Brien says, because it showed that the AIDS virus can be thwarted that way.

Though cats and people differ precisely because of their genes, to scientists, it's often the similarities that count. Cats and people have roughly the same number of genes, 50,000 or so. Human beings have 23 pairs of chromosomes on which those genes are arrayed, and cats have 19 chromosomes. The line-ups of particular feline and human genes are remarkably alike on 16 chromosomes. (By contrast, mouse and human genes line up on chromosomes only about one-fifth as often.) Scientists are trying to find out why cats and people have so many features of their genomes in common—features, they say, that may hold clues to the evolution of the two species.

Since O'Brien started the Cat Genome Project, scientists have pinpointed 590 functional feline genes, which instruct the cell to make specific proteins, and another 620 genetic "markers," stretches of DNA that appear at particular spots along the chromosome but don't necessarily tell the cell to do anything. Together, those genes and markers, scattered across the cat's chromosomes, serve as guideposts for scientists trying to "map" the remaining feline genes. And because the pattern of those chromosome markers differs slightly from cat to cat, it also serves as a telltale DNA fingerprint.

Which brings us to that murder case. A few years ago, the Royal Canadian Mounted Police asked Marilyn Menotti-Raymond, a geneticist working in O'Brien's lab, whether DNA could determine whether a cat hair found at a murder scene had come from a pet belonging to the leading suspect. Comparing DNA markers from the two samples, Menotti-Raymond said yes, they matched beyond a reasonable scientific doubt. The crime scene hair almost certainly came from the suspect's cat, which was named Snowball, and the suspect was soon convicted.

The U.S. Department of Justice has provided funds to Menotti-Raymond to build up a database of cat DNA markers, based on blood and saliva samples from different breeds tested across the United States. She has found that the likelihood that two cats have the same ten genetic markers in the exact same chromosome locations is about 1 in 10 million to 1 in 10 trillion. O'Brien has a jokey name for the highly negligible probability that two different cats have the same DNA fingerprint. He calls it "A Snowball's chance."

Stephen Budiansky's book, The Character of Cats, *was just published by Viking.*

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Brief Summary (For full Prescribing Information, see package insert.)

INDICATIONS AND USAGE: Allergic Rhinitis: CLARINEX Tablets 5 mg are indicated for the relief of the nasal and non-nasal symptoms of allergic rhinitis (seasonal and perennial) in patients 12 years of age and older.

Chronic Idiopathic Urticaria: CLARINEX Tablets are indicated for the symptomatic relief of pruritus, reduction in the number of hives, and size of hives, in patients with chronic idiopathic urticaria 12 years of age and older.

CONTRAINDICATIONS: CLARINEX Tablets 5 mg are contraindicated in patients who are hypersensitive to this medication or to any of its ingredients, or to loratadine.

PRECAUTIONS: Carcinogenesis, Mutagenesis, Impairment of Fertility: The carcinogenic potential of desloratadine was assessed using loratadine studies. In an 18-month study in mice and a 2-year study in rats, loratadine was administered in the diet at doses up to 40 mg/kg/day in mice (estimated desloratadine and desloratadine metabolite exposures were approximately 3 times the AUC in humans at the recommended daily oral dose) and 25 mg/kg/day in rats (estimated desloratadine and desloratadine metabolite exposures were approximately 30 times the AUC in humans at the recommended daily oral dose). Male mice given 40 mg/kg/day loratadine had a significantly higher incidence of hepatocellular tumors (combined adenomas and carcinomas) than concurrent controls. In rats, a significantly higher incidence of hepatocellular tumors (combined adenomas and carcinomas) was observed in males given 10 mg/kg/day and in males and females given 25 mg/kg/day. The estimated desloratadine and desloratadine metabolite exposures of rats given 10 mg/kg of loratadine were approximately 7 times the AUC in humans at the recommended daily oral dose. The clinical significance of these findings during long-term use of desloratadine is not known.

In genotoxicity studies with desloratadine, there was no evidence of genotoxic potential in a reverse mutation assay (*Salmonella/E. coli* mammalian microsome bacterial mutagenicity assay) or in two assays for chromosomal aberrations (human peripheral blood lymphocyte clastogenicity assay and mouse bone marrow micronucleus assay).

There was no effect on female fertility in rats at desloratadine doses up to 24 mg/kg/day (estimated desloratadine and desloratadine metabolite exposures were approximately 130 times the AUC in humans at the recommended daily oral dose). A male specific decrease in fertility, demonstrated by reduced female conception rates, decreased sperm numbers and motility, and histopathologic testicular changes, occurred at an oral desloratadine dose of 12 mg/kg in rats (estimated desloratadine exposures were approximately 45 times the AUC in humans at the recommended daily oral dose). Desloratadine had no effect on fertility in rats at an oral dose of 3 mg/kg/day (estimated desloratadine and desloratadine metabolite exposures were approximately 8 times the AUC in humans at the recommended daily oral dose).

Pregnancy Category C: Desloratadine was not teratogenic in rats at doses up to 48 mg/kg/day (estimated desloratadine and desloratadine metabolite exposures were approximately 210 times the AUC in humans at the recommended daily oral dose) or in rabbits at doses up to 60 mg/kg/day (estimated desloratadine exposures were approximately 230 times the AUC in humans at the recommended daily oral dose). In a separate study, an increase in preimplantation loss and a decreased number of implantations and fetuses were noted in female rats at 24 mg/kg (estimated desloratadine and desloratadine metabolite exposures were approximately 120 times the AUC in humans at the recommended daily oral dose). Reduced body weight and slow righting reflex were reported in pups at doses of 9 mg/kg/day or greater (estimated desloratadine and desloratadine metabolite exposures were approximately 50 times or greater than the AUC in humans at the recommended daily oral dose). Desloratadine had no effect on pup development at an oral dose of 3 mg/kg/day (estimated desloratadine and desloratadine metabolite exposures were approximately 7 times the AUC in humans at the recommended daily oral dose). There are, however, no adequate and well-controlled studies in pregnant women. Because animal reproduction studies are not always predictive of human response, desloratadine should be used during pregnancy only if clearly needed.

Nursing Mothers: Desloratadine passes into breast milk, therefore a decision should be made whether to discontinue nursing or to discontinue desloratadine, taking into account the importance of the drug to the mother.

Pediatric Use: The safety and effectiveness of CLARINEX Tablets in pediatric patients under 12 years of age have not been established.

Geriatric Use: Clinical studies of desloratadine did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects. Other reported clinical experience has not identified differences between the elderly and younger patients. In general, dose selection for an elderly patient should be cautious, reflecting the greater frequency of decreased hepatic, renal, or cardiac function, and of concomitant disease or other drug therapy. (see **CLINICAL PHARMACOLOGY – Special Populations**).

Information for Patients: Patients should be instructed to use CLARINEX Tablets as directed. As there are no food effects on bioavailability, patients can be instructed that CLARINEX Tablets may be taken without regard to meals. Patients should be advised not to increase the dose or dosing frequency as studies have not demonstrated increased effectiveness at higher doses and somnolence may occur.

ADVERSE REACTIONS: Allergic Rhinitis: In multiple-dose placebo-controlled trials, 2,834 patients received CLARINEX Tablets at doses of 2.5 mg to 20 mg daily, of whom 1,655 patients received the recommended daily dose of 5 mg. In patients receiving 5 mg daily, the rate of adverse events was similar between CLARINEX and placebo-treated patients. The percent of patients who withdrew prematurely due to adverse events was 2.4% in the CLARINEX group and 2.6% in the placebo group. There were no serious adverse events in these trials in patients receiving desloratadine. All adverse events that were reported by greater than or equal to 2% of patients who received the recommended daily dose of CLARINEX Tablets (5.0 mg once-daily), and that were more common with CLARINEX Tablet than placebo, are listed in Table 5.

Table 5

Incidence of Adverse Events Reported by ≥ 2% of Allergic Rhinitis Patients in Placebo-Controlled, Multiple-Dose Clinical Trials

Adverse Experience	CLARINEX Tablets 5 mg (n=1,655)	Placebo (n=1,652)
Pharyngitis	4.1%	2.0%
Dry Mouth	3.0%	1.9%
Myalgia	2.1%	1.8%
Fatigue	2.1%	1.2%
Somnolence	2.1%	1.8%
Dysmenorrhea	2.1%	1.6%

The frequency and magnitude of laboratory and electrocardiographic abnormalities were similar in CLARINEX and placebo-treated patients.

There were no differences in adverse events for subgroups of patients as defined by gender, age, or race.

Chronic Idiopathic Urticaria: In multiple-dose, placebo-controlled trials of chronic idiopathic urticaria, 211 patients received CLARINEX Tablets and 205 received placebo. Adverse events that were reported by greater than or equal to 2% of patients who received CLARINEX Tablets and that were more common with CLARINEX than placebo were (rates for CLARINEX and placebo, respectively): headache (14%, 13%), nausea (5%, 2%), fatigue (5%, 1%), dizziness (4%, 3%), pharyngitis (3%, 2%), dyspepsia (3%, 1%), and myalgia (3%, 1%).

The following spontaneous adverse events have been reported during the marketing of desloratadine: tachycardia, and rarely hypersensitivity reactions (such as rash, pruritus, urticaria, edema, dyspnea, and anaphylaxis), and elevated liver enzymes including bilirubin.

DRUG ABUSE AND DEPENDENCE: There is no information to indicate that abuse or dependency occurs with CLARINEX Tablets.

OVERDOSAGE: Information regarding acute overdosage is limited to experience from clinical trials conducted during the development of the CLARINEX product. In a dose ranging trial, at doses of 10 mg and 20 mg/day somnolence was reported.

Single daily doses of 45 mg were given to normal male and female volunteers for 10 days. All ECGs obtained in this study were manually read in a blinded fashion by a cardiologist. In CLARINEX-treated subjects, there was an increase in mean heart rate of 9.2 bpm relative to placebo. The QT interval was corrected for heart rate (QT_c) by both the Bazett and Fridericia methods. Using the QT_c (Bazett) there was a mean increase of 8.1 msec in CLARINEX-treated subjects relative to placebo. Using QT_c (Fridericia) there was a mean increase of 0.4 msec in CLARINEX-treated subjects relative to placebo. No clinically relevant adverse events were reported.

In the event of overdose, consider standard measures to remove any unabsorbed drug. Symptomatic and supportive treatment is recommended. Desloratadine and 3-hydroxydesloratadine are not eliminated by hemodialysis.

Lethality occurred in rats at oral doses of 250 mg/kg or greater (estimated desloratadine and desloratadine metabolite exposures were approximately 120 times the AUC in humans at the recommended daily oral dose). The oral median lethal dose in mice was 353 mg/kg (estimated desloratadine exposures were approximately 290 times the human daily oral dose on a mg/m^2 basis). No deaths occurred at oral doses up to 250 mg/kg in monkeys (estimated desloratadine exposures were approximately 810 times the human daily oral dose on a mg/m^2 basis).

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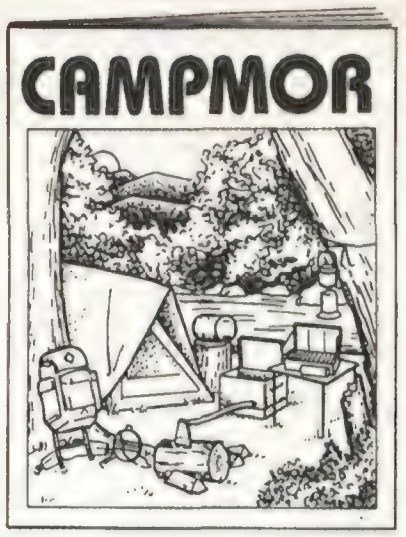

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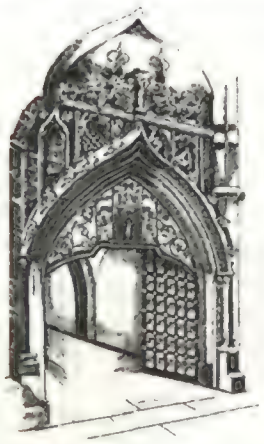

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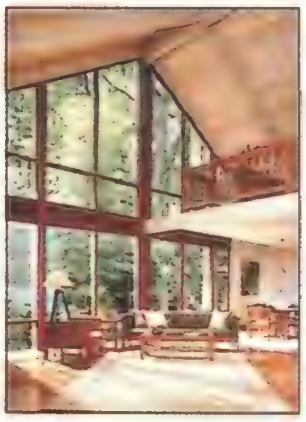

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GOING HOME—More than a thousand passengers crowd the *Iyembe's* decks as it travels up the Congo River from the Democratic Republic of the Congo's capital, Kinshasa, to Mbandaka, 400 miles northeast. A brutal civil war tore the country apart following the 1997 fall of President Mobutu Sese Seko (who also died in 1997), making the river virtually impassable. The photograph is by news photographer Malcolm Linton/Matrix.

PEOPLE FILE

Puzzle Master

AN AMERICAN SCHOLAR IN BRITAIN OVERSEES THE WORLD'S LARGEST CACHE OF PAPYRUS ROLLS, KEYS TO ANTIQUITY

BY TOM DUNKEL

A TEN-FOOT-LONG STRIP OF TEA-colored papyrus, a relic of fifth-century A.D. Egypt, lies on a tabletop beneath protective glass. "These are accounts of wine and grain from a large imperial estate," Dirk Obbink says, perusing the Greek script in a windowless room at Oxford University's Ashmolean Museum in England. "Huge quantities of wine and grain—enough to fill today's airplane hangars—ready to be shipped to Constantinople."

Obbink, a 45-year-old native of Nebraska with moppish hair and round wire spectacles, is the University Lecturer in Papyrology at Oxford and helps curate the university's papyrus collection, the world's largest. His contributions to the arcane field of papyrology, which involves restoring and interpreting ancient Greek and Latin documents, prompted the MacArthur Foundation to award him a $500,000 grant last year. He has helped open "new windows on poetry, society and philosophy in the classical period," the foundation said, citing, among other things, the scholar's "extraordinary diligence." As though to prove the point, Obbink didn't so much as pop a champagne cork when told he'd won the so-called genius award. "He stayed very late in the papyrus lab that night," says colleague Rosalia Chatzilamprou. "He kept on working."

The work typically consists of puzzling together postage-stamp-size remnants of papyrus, a writing material woven of fibers from the plant of the same name that was used as paper by Egyptians, Greeks and Romans from the sixth century B.C. until the eighth century A.D. By any measure, papyrology stretches the concept of "painstaking." The Ashmolean's Sackler Library possesses a venerable cache of 50,000 papyrus scraps, or papyri—literary texts, school lessons and various public and private records like tax receipts—from a Greco-Roman settlement in Egypt called Oxyrhynchus. But after more than a century of research on the material, scholars have made sense of a mere 5 percent of it.

"Extraordinary diligence" characterizes Oxford's Obbink (with 1,800-year-old reassembled papyrus from the *Iliad*.)

Papyrologists are such puzzle masters that the Allies put them to work as code breakers in World War II. They must rely on subtle variations in a scribe's handwriting and changes in lettering over time to establish the age of a papyrus. For example, the line across the top of the Greek letter tau (T) was in two halves, broken in the middle, until the first century A.D.

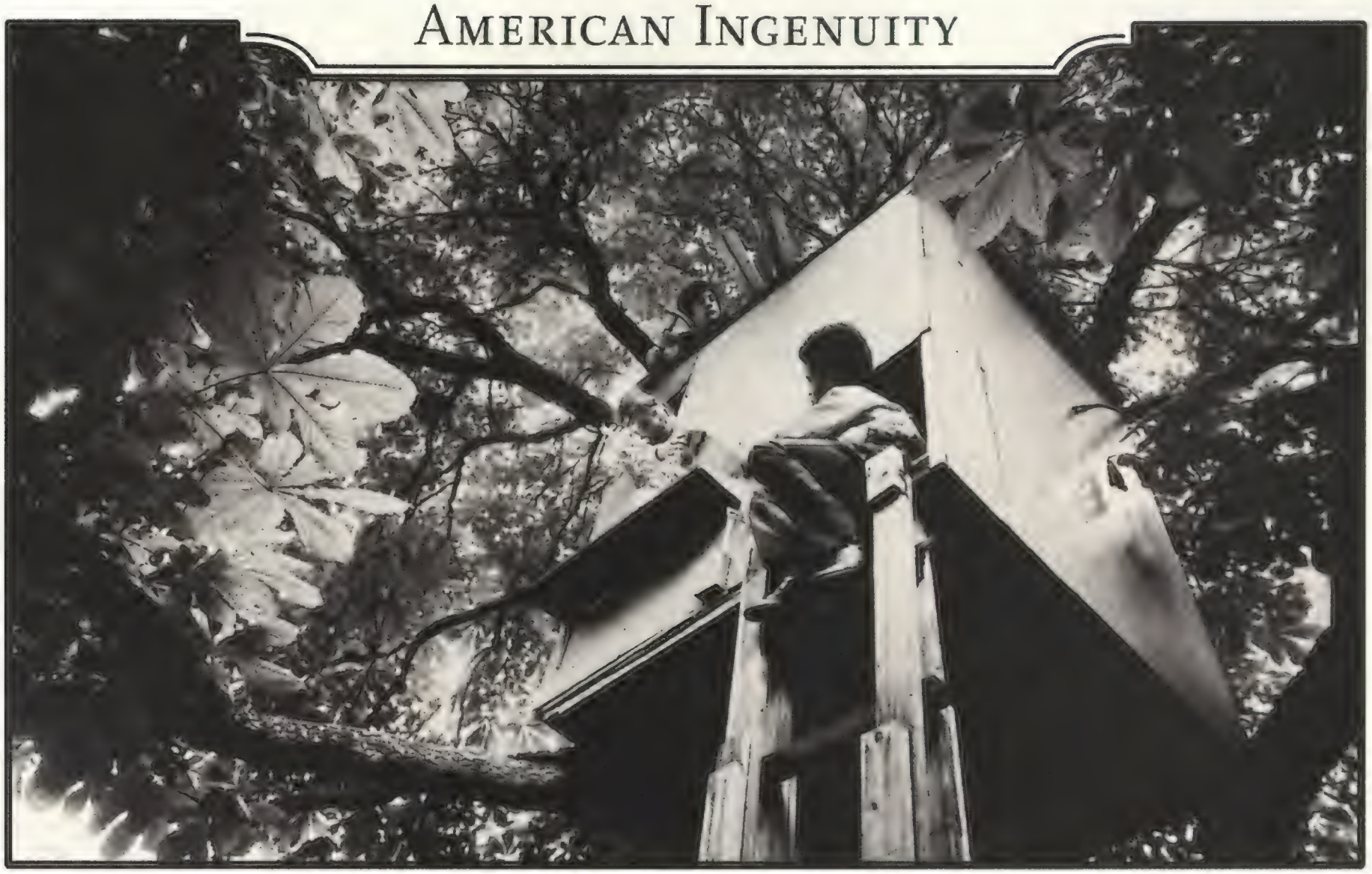
Obbink, who sometimes looks at papyrus sheets upside down to better focus on stubborn passages, is best known for his clever deciphering of papyri from Herculaneum, in Italy, which was entombed by volcanic ash along with Pompeii when Mount Vesuvius erupted in A.D. 79.

Excavators in the 1750s recovered some 1,500 papyri from a single buried Herculaneum villa, and over the years scholars attempting to unroll the hardened documents did more harm than good. They resorted to splitting some of the rolls apart, as if cutting a charred onion in half to get at its undamaged core. The result was thousands of badly labeled fragments, which got further scrambled while being moved to the Museum of Naples.

It was Obbink who, as a graduate student at Stanford University, began to sort things out. Building on the work of previous scholars, he noticed a syntax match between the end of one page of the Herculaneum papyri and the beginning of another. He put more blocks of text in order by using numbers jotted on the fragments by 19th-century copyists. More text fell into place when he figured out the labeling system devised by the 18th-century scholars who cut the rolls apart. And he created a geometric formula that enabled him to reconstruct a halved papyrus by assuming that the pieces would get larger as they approached the outermost layer of the roll. The work, which made

ALL: ROBERT WALLIS

American Ingenuity



With imagination, good tools and a lot of elbow grease, anything is possible.

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accessible a great library of writings and the lost world they represented, dazzled colleagues. "An intellectual feat of the highest order," says Oxford Greek scholar Peter Parsons.

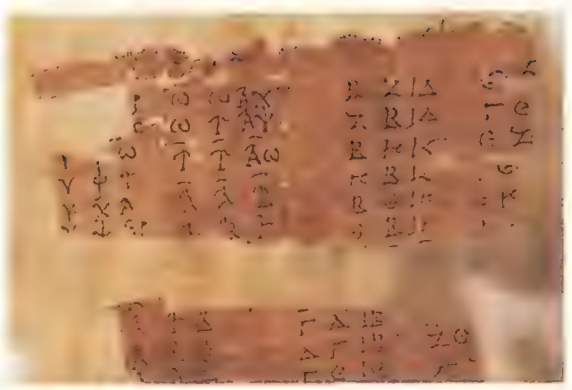
"Dirk is a man of many parts," says Duke University classicist John Oates. "His knowledge of Greek and Latin is absolutely tops, but he has a brilliant imagination. And he knows the whole range of things having to do with papyri, including work in the field."

Among the jewels of the vast Oxford papyrus collection Obbink helps curate are relics of Oxyrhynchus, a settlement that thrived 2,300 years ago on a Nile tributary 200 miles south of Cairo. It was a community of 35,000 people, most of them Greek immigrants, who left behind tons of papyri upon which slaves trained in Greek had documented the community's arts and most minute goings-on. Beginning in 1895, two Oxford historians salvaged some 50,000 papyri from what was apparently the town dump and shipped back to the university some 800 containers of census returns, wedding announcements, deeds, instructions on how to build a cistern, and heaps of lost literature—from a narrative poem about Hercules to most of a Sophocles play, *Trackers*.

Included among the documents shipped to Oxford were lost works of Sappho, a poet on the island of Lesbos in the early sixth century B.C. Today her lyrics might seem tame, but they once threw off erotic sparks, as in this fragment of a poem she addressed to Aphrodite, "scheming daughter of Zeus": "For though she flee, soon she'll be chasing; though she refuse gifts, she'll be giving; though she loves not, she'll love despite herself. . . . "

Obbink says, "The monks [in the Middle Ages] wouldn't copy her works, so she didn't survive except for Oxyrhynchus. That was a pretty clear case of censorship. She's a virtuoso. The best poet of antiquity."

The past has had a hold on Obbink since he was a boy in Lincoln, Nebraska. His father was a federal housing official and his mother worked in state government. He had two siblings, and dinner-table conversation was lively and varied. His mother, Dorithy Obbink, recalls that Dirk's idea of a childhood treat was to rummage around in bric-a-brac shops and thrift stores. He loved to dig around in the town dump, collecting iron pots and old stoves. "To me," she says, "it was a bunch of junk."



Obbink combines classic scholarship and modern methods (left) to recover texts like the first-century Greek schoolbook (above).

Young Dirk played French horn, drums and guitar. He made stained-glass artwork. He was a crack motorcycle mechanic. "I never did view Dirk as a typical Nebraska-guy type," says his brother, Brad, 43, a professional trumpet player and band leader. Dirk attended the University of Nebraska, where he earned a master's degree in Greek and Latin before earning a doctorate in classics at Stanford. (He landed at Oxford in 1995.) He is married to Beate Dignas, his second wife, a professor of ancient history at the University of Michigan. (They are racking up frequent flyer miles.)

A rarefied intellect coupled with an inordinate fondness for trash runs as a leitmotiv through Obbink's life. When he taught at Columbia University in the 1980s and his daughter, Elisabeth, now 24, was a child, they would often go "Dumpster diving" for discarded chairs and other treasures. The family ate dinner off a pool table in the living room. He might have known everything about Horace, says Elisabeth, who runs a shelter for homeless women in Brooklyn, but he was terrible at Trivial Pursuit. "He's the kind of smart that's sort of 'out there.'"

One night last fall, Obbink donned a black tie and joined a dozen faculty members and guests for "High Table" in the Gothic dining hall where scenes from the Harry Potter movie were filmed. As waiters poured wine into crystal goblets under a life-size portrait of Henry VIII, the papyrologist was asked if his childhood friends would be surprised to see him now. He grinned, as if to acknowledge that he'd come a far piece from the rubbish heaps of Lincoln, Nebraska.

Obbink credits computer technology with making his work much easier. It not only can search volumes in a flash but also can enhance faded lettering that was previously illegible. "I've worked on this papyrus for ten years and I've never seen the inscription this clearly," he says, peering at a treatise displayed on a computer monitor in the Ashmolean's papyrus lab. But the computer is not about to put Obbink out of a job; it still takes imagination to piece together the past. And when might he and his colleagues finish translating the great Oxyrhynchus papyri? Obbink laughed: "We've got enough here for 40 lifetimes."

Freelance writer Tom Dunkel lives in Washington, D.C.

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How does *Avandia* treat type 2 diabetes?
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What if I miss a dose?
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- Take the next dose at the normal time on the same day.
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Do I need to test my blood for sugar while using *Avandia*?
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What should I discuss with my doctor before taking *Avandia*?
Avandia in combination with insulin may increase the risk of serious heart problems. Because of this, talk to your doctor before using *Avandia* and insulin together. *Avandia* may cause fluid retention or swelling which could lead to or worsen heart failure, so tell your doctor if you have a history of these conditions. You should also talk to your doctor if you have liver problems, or if you are nursing, pregnant or thinking of becoming pregnant. If you are a premenopausal woman who is not ovulating, you should know that *Avandia* therapy may result in the resumption of ovulation, which may increase your chances of becoming pregnant. Therefore, you may need to consider birth control options.

What are the possible side effects of *Avandia*?
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Who should not use *Avandia*?
You should not take *Avandia* if you are in the later stages of heart failure or if you have active liver disease. The following people should also not take *Avandia*: People with type 1 diabetes, people who experienced yellowing of the skin with Rezulin® (troglitazone, Parke-Davis), people who are allergic to *Avandia* or any of its components and people with diabetic ketoacidosis.

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Your doctor may conduct blood tests to measure your blood sugar control. Blood tests to check for serious liver problems should be conducted before starting *Avandia*, every 2 months during the first year, and periodically thereafter.

It is important that you call your doctor immediately if you experience unexplained symptoms of nausea, vomiting, stomach pain, tiredness, anorexia, dark urine, or yellowing of the skin.

How should I store *Avandia*?
Avandia should be stored at room temperature in a child-proof container out of the reach of children. Store *Avandia* in its original container.

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THE OBJECT AT HAND

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AFTER A VISITING SCHOLAR UNCOVERED BURIED TREASURE AT THE COOPER-HEWITT, THE VERIFICATION PROCESS BEGAN

BY MARIO NAVES

IT'S A TALE OF UNEXPECTED RICHES THAT TRUMPS any discovery revealed on TV's *Antiques Roadshow*: in April, a renowned British scholar unearthed an unsigned drawing by the Italian master painter, sculptor and architect Michelangelo Buonarroti, estimated to be worth $10 million to $12 million. A visiting scholar, Sir Timothy Clifford, director of the National Galleries of Scotland, uncovered the treasure in the collection of the Smithsonian's Cooper-Hewitt, National Design Museum in New York City. Only 400 or so drawings by Michelangelo (1475-1564) are known to exist; fewer than a dozen of these are held by museums in the United States.

"I am a lucky man who was in the right place in the right time," says Sir Timothy, recalling the moment he first spied the drawing as he rummaged around in a Cooper-Hewitt storeroom, sifting through the contents of a box of sketches by unknown Italian artists. "Did the Michelangelo jump out at me? Of course it did. I'm used to whizzing through boxes of objects, and I don't stop until I see something with a wonderful quality to it. The piece from Cooper-Hewitt has that quality."

"Like recognizing a friend in the street," says Sir Timothy (left) of finding the drawing (detail above).

Sir Timothy arrived in Manhattan this past spring, at the invitation of Paul Warwick Thompson, the Cooper-Hewitt's director, to spend a monthlong sabbatical viewing the museum's sizable holdings in Italian drawings and prints. The nation's only museum devoted exclusively to historic and contemporary design, the Cooper-Hewitt contains more than 250,000 objects, dating from the Han dynasty to the present, and is among the world's largest design repositories.

Startling discoveries are nothing new for Sir Timothy—he's been spotting old master drawings in museum storerooms, bookshops and flea markets for close to 40 years. He possesses, says the Cooper-Hewitt's Thompson, "an unbelievable set of eyes with an unbelievable knack for finding great art."

Still, this recent find, a drawing depicting a candelabrum rendered in black chalk, brush strokes and brown wash, represents, in Thompson's words, a "once-in-a-museum's-lifetime" discovery. Sir Timothy came across the rare artwork after having spent only two weeks in the Cooper-Hewitt's Drue Heinz Study Center for Drawings and Prints. Attributing it to Michelangelo almost immediately, he speculated that the design for the monumental candlestick had been produced as part of a commission for the

DAN WELLDON; MATT FLYNN/COOPER-HEWITT, NATIONAL DESIGN MUSEUM, NEW YORK

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Although famed for his monumental architecture, sculpture and frescoes, Michelangelo produced a number of decorative objects.

Medici family's funerary chapel in Florence. The chapel was never built.

Measuring 17 inches high and 10 inches wide, the drawing came into the Cooper-Hewitt's possession in 1942. Identified only as "Italian, circa 1530-1540," it was purchased, along with four other quattrocento decorative-object designs, from the London art dealer P & D Colnaghi for $60. Ornamental flourishes, characteristic of the period, embellish the pedestal and shaft of the three-tiered candelabrum, in a High Renaissance riot of garlands, ram's heads, griffins and hovering seraphim. An entire scene, faintly outlined on the elongated bottom tier, depicts the sacrificial slaughter of an ox. In a touch of 16th-century drollery, lion's paws ornament the base. Had it ever been constructed as the artist envisioned it, the fixture would have stood between 15 and 16 feet high.

Underlying the power of the drawing, and its significance to art historians, is a reflection of the artist's mind at work, in diagrams and notations concerning the scale and shape of the candelabrum. In addition, the artist specifies how the piece's gracefully branching arms would be fitted to the main structure.

The museum responded to the find with caution. (After all, it was only a few years back, in 1996, that a marble sculpture of a cupid in the lobby of the French Consulate on Fifth Avenue in New York City, was declared, with great fanfare, to be a Michelangelo. But the cherub soon disappeared from newspaper pages, consigned to the limbo of disagreement among the experts. Today, scholars continue to debate the attribution; no consensus has been reached.) The Cooper-Hewitt held off any announcement of Sir Timothy's find and launched exhaustive efforts to verify attribution.

Within several weeks of the discovery, the precious sheet of paper was crated and hand carried on a flight to London. At the British Museum, scholars, conducting a

BETTMANN/CORBIS

crucial exercise in comparison, placed it alongside others by Michelangelo. One of the holdings in the British Museum collections, a design for a saltcellar (a small dish for holding the condiment), also incorporates the lion paw ornamentation visible in the Cooper-Hewitt piece. In addition, experts juxtaposed the rendering of the candelabrum against drawings by Perino del Vaga (1501-1547), the artist to whom the piece had been ascribed after it was acquired by the Cooper-Hewitt.

One key variable in the Michelangelo attribution was the presence of finely incised lines, visible in the margins of the drawing. During the Renaissance, many artists employed a sharp metal stylus to block out a drawing or design before executing it—a technique used to prevent the waste of paper, a scarce and expensive 16th-century commodity. While a number of extant Michelangelo drawings reflect this practice, the technique is unknown in del Vaga's work.

"The prior attribution to del Vaga was an intelligent mistake," says Sarah E. Lawrence, who oversees the Cooper-Hewitt's Master's Program in the History of Decorative Arts. "Seeing the piece in the context of a wider grouping of drawings by both artists, it was obvious that the design for the candelabrum was the work of Michelangelo."

Laboratory analysis verified the paper and materials to be, appropriately, 500 years old. Even so, attribution relied largely on connoisseurship—an expert's capacity to discern stylistic characteristics, sometimes minute, always important—that inform judgments of this kind. "Connoisseurship matters vitally," says Sir Timothy. "Without it, artistic questions give way to theory, and theory leads to nonsense." It was this kind of educated intuition that led him to identify the work of Michelangelo as unhesitatingly, Sir Timothy says, as if he were recognizing "a friend in the street or my wife across the breakfast table."

The Cooper-Hewitt plans to put the drawing on display within a year. Director Thompson envisions "a new permanent collection gallery—something the museum is, surprisingly, currently without—that will house the Michelangelo." He would also like to mount an exhibition in which the Cooper-Hewitt's treasure would be "placed in the context of other drawings by Michelangelo."

While the drawing would constitute a stellar addition to any museum's collection, for the Cooper-Hewitt it speaks to the heart of the institution by underscoring, says Lawrence, "how design, which is currently considered a 'minor art,' can impact our lives and our culture." Once people start lining up around the block at the Cooper-Hewitt, which they will likely do when the drawing goes on display, visitors will have an uncommon opportunity to see the hand of a genius applied to the relatively small task of designing a candlestick.

Writer Mario Naves is an art critic for the New York Observer.

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UNCOMMON VALOR

WHEN TWO NAVAL OFFICERS ENTERED THE INFERNO OF THE PENTAGON'S WEST FLANK TO SEARCH FOR SURVIVORS, THEY PUT THEIR OWN LIVES ON THE LINE

BY KEN RINGLE

THE FIRST THING TO UNDERSTAND IS THAT, UNTIL THE MOment American Airlines Flight 77 actually struck the Pentagon at 9:38 that morning, the three men heard nothing. The rest of us in the Washington, D.C. area may live with the noise of passenger jets flying in and out of Reagan National Airport every minute, but everyone working in the great, pentagonal building, located almost directly beneath its northern flight path, labors insulated from that roar. Some of the same measures that secured the hum of its phones, computers and code machines from the electronic snoopers outside also muffled the deafening rumble of fuel-freighted airliners screaming by overhead. Nobody ever thought of them as flying bombs.

The second thing to recognize is that none of the three knew one another. They were three human cogs in the 24,000-strong

After American Airlines Flight 77 hit, Capt. David Thomas (left) and Lt. Cmdr. David Tarantino (center) pulled Jerry Henson (right) from the burning rubble. All three men (wearing mandatory hard hats at the Pentagon's reconstruction site) are now back at work. The moment of impact was recorded by a security camera.

Pentagon workforce. They were assigned to different floors in separate rings of offices, disparate bureaucratic kingdoms within the concentric, five-sided design that gives the world's largest office building its name. Had it not been for Osama bin Laden, the three might never have met.

Of course, in the end none of that mattered. The three men were welded together for the rest of their lives by a half-hour hellscape of searing flame and shattered bodies and smoke so thick and suffocating they coughed up black sludge from their lungs for days.

"It was raining molten metal and plastic," remembers Capt. David M. Thomas, Jr., 44, a distant look of intensity in his eyes. "The soldered connections in the overhead wiring and the insulation were melting. I took off my uniform blouse because it had polyester in it and I was sure it would melt. I was wearing just my cotton T-shirt. But then the molten liquid from the ceiling dripped on more of my body. The drops made little black holes as they burned through my skin."

"I didn't want to go in there," says Lt. Cmdr. David Tarantino, 36, remembering the moment he reached the crash site. "It was like an apocalypse."

Tarantino, a Navy physician who helps coordinate humanitarian relief efforts for the Department of Defense, had rushed from his fourth-floor office in the centermost A ring (the building, like a tree, has concentric rings, each configured pentagonally) at the moment he felt a "violent shudder" of the building. He had just returned from a meeting to find colleagues watching the burning World Trade Center on television, had seen the second plane hit and was sure that now the Pentagon, too, had come under attack. But he recalls hearing no noise when Flight 77 struck the building.

Tarantino, a 6-foot-4, 180-pound triathlete who had rowed crew for Stanford, ran down one of the corridors radiating from the Pentagon's central courtyard. The hallway was filled with smoke and with coughing, bleeding people who were stumbling around, disoriented. The heat and smoke, rising to ceiling height, had effectively hidden all exit signs. Many were uncertain, amid the wailing fire-alarm sirens, which way to go. Grabbing some wet paper towels from a nearby rest room as a rudimentary gas mask, and working his way from floor to floor, Tarantino helped direct people toward the courtyard. Then, turning against the flow of people fleeing to safety, he headed toward what appeared to be the point of greatest destruction.

"All of a sudden it was dark and hot, and the air was filled with smoke and the smell of jet fuel. I couldn't move. And I was in excruciating pain."

Between B and C rings, radial corridors transect an open-air ring: a breezeway, into which Tarantino lurched to get some air. There he saw two large smoking holes in the C-ring walls and what was clearly the forward landing gear and huge tire of a jetliner. There were also body parts. "I may be a doctor," he says, "but nothing prepares you for that kind of devastation."

People were trying to fight their way into the holes with fire extinguishers. They couldn't stay long. It was like a blast furnace. "Is anybody in there?" Tarantino yelled.

Dave Thomas worked on C ring, in a section two corridors away from the airliner's impact point. Thomas is a second-generation Naval officer with two brothers in the Navy and one in the Marines. From December 1998 to July 2000, he had been skipper of the USS *Ross*, one of the new missile-studded Arleigh Burke class destroyers that are the pride of the Navy's surface fleet. Now ashore, he was working on the quadrennial defense review for the Chief of Naval Operations. The report was due September 30.

When Flight 77 hit, all Thomas could think was that his best friend worked in that section of the building. Bob Dolan had been like a brother since their days rooming together at Annapolis. He had been the best man at Thomas' wedding and was godfather to one of his kids. No one outside Thomas' immediate family was more important to him.

Racing down a stairway, Thomas made his way through the smoke to the breezeway and the giant tire and the gaping holes. Inside one of the holes, he heard voices behind a door.

Somebody handed him a metal bar and he pounded on the door. But, like many secure areas in the Pentagon, it was sealed with an electric cipher lock. The door wouldn't give. He knew he had to find another way in. Grabbing a fire extinguisher, he crawled into the smaller of the two holes.

"The plane had punched through an electrical closet; all these live wires were lying around and arcing in the water [from sprinklers or burst mains]. You had to crawl over the wires through the water while you were getting shocked. There was so much smoke, you could not see. But I had grabbed a flashlight from somewhere, and two people on the floor inside were able to see the beam of light and make their way out past me. I saw the head of another guy. I knew we had to get him out, but I wasn't sure I could. It was all you could do in there just to breathe."

Thomas had grabbed a wet T-shirt to breathe through and protect his balding scalp. Then, with his shoes literally melting on his feet, he crawled forward, into the firestorm of molten rain.

P. 46 ASSOCIATED PRESS; P. 47 BILL BALLENBERG

After the first few hours, rescue and recovery efforts at the Pentagon (here, on the morning of September 15) yielded no additional survivors. A memorial near the site is being planned.

RON EDMONDS/AP PHOTO

The shattered room he was entering was part of the new Navy Command Center, a vast war room filled with the techno-ganglia of cyber communications. One of the 50-odd staffers who worked there was Jerry Henson, a 65-year-old former Navy commander who had returned to the Pentagon after retirement. He liked being at the center of things. (One of the little-known secrets of the Pentagon is that, while active-duty officers rotate in and out of these offices during their careers, nominal civilians like Henson maintain a crucial continuity in vital departments.)

He, too, had returned to his office from a meeting in time to see the second jet hit the World Trade Center. Moments later, the lights went out.

"It was like being hit in the head with a baseball bat," he remembers. "There was no sense of gradualism, or of the plane coming through the walls or anything like that. I heard one loud report, and all of a sudden it was dark and hot, and the air was filled with smoke and the smell of jet fuel. I couldn't move. And I was in excruciating pain."

A huge wall of debris—ceiling, bookcases, wallboard, desks, plumbing—had slammed into him, pinning his head between his computer monitor and his left shoulder. The rubble probably would have crushed him, but his desk top had dislocated across the arms of his chair, imprisoning him but supporting most of the weight.

"There were two enlisted people nearby on the floor, but they couldn't get to me. It was pitch dark and suffocating in the smoke. We were all coughing and strangling and yelling for help but never heard any answer from the other side of the wall. The room was burning and melting around us."

Henson didn't dwell on the fact that he might die. He had spent 21 years in the Navy, flown 72 combat missions in Vietnam and been trained for emergency response. "Every fiber of my being was focused on getting out of there," he says. "I had nothing left for anything else."

After about 15 minutes, he says, he was able to gradually dig enough rubble from around his head to straighten his neck a bit. That eased the pain. But the smoke was getting thicker; it was getting harder and harder to breathe. The increasing rain of solder and plastic from the ceiling told him the room couldn't last much longer. Then he saw the beam of a flashlight.

David Tarantino had worked his way with a fire extinguisher over the snarl of live wires into the smaller of

Deputy Defense Secretary Paul Wolfowitz (left) and renovation manager W. Lee Evey placed a time capsule, bearing the names of the 184 victims of the attack, inside the wall of the Pentagon June 11. The charred limestone block was then set into the facade.

JAMES A. PARCELL/WASHINGTON POST

the two holes in the breezeway wall, throwing aside flaming debris as he went. Somehow the physician had chosen a slightly different route from Thomas'. "When I finally saw Jerry, he was looking right at me," Tarantino remembers. "We made eye contact. I yelled, 'Come on, man, get out of there! You got to get out of there.' I wanted him to come to me. I didn't want to go where he was. It was hell in there."

But Henson still couldn't move. Thomas had reached him from the other side of the debris pile but couldn't budge the rubble pinning him down. Henson couldn't see Thomas. He could see Tarantino, but was fading in and out of consciousness from smoke inhalation. "I was near the end," Henson says. "I had maybe five minutes left."

Tarantino knew time was running out. "He crawled in through all that fire and dripping metal and lay down beside me," Henson says. "He said, 'I'm a doctor and I'm here to get you out.' Then he lay on his back and leg-pressed that wall of debris enough so I could squeeze over the chair arm." Tarantino inched Henson out, and Thomas freed him the rest of the way. Henson recalls, "Tarantino had the bruises from my fingers on his arms for a week."

The three men had made it into the breezeway when the command center's interior structure collapsed. Cmdr. Craig Powell, a Navy SEAL, had singlehandedly held up part of a flaming wall that had kept their escape route open.

One hundred twenty-five people died at the Pentagon, not counting the more than 60 passengers, crew and hijackers aboard Flight 77. More than a hundred others were injured in the explosion and fire. Jerry Henson was treated at the scene for head cuts and given an IV and oxygen and hospitalized for four days, mostly for smoke inhalation problems. He was back at work a month later.

He still doesn't wholly understand why he didn't burn to death but says the rubble that trapped him probably shielded him from the worst of the fire. And the Pentagon sprinkler system, or what was left of it, may have watered him at some point. "I was soaked to the skin when they finally dragged me to the courtyard," he says. "But I don't remember getting wet."

Thomas and Tarantino suffered burns on their hands, knees and feet as well as smoke inhalation. Both were back at work the next day.

"I don't have words to describe how brave they were," Henson says of his rescuers. "There's a limit to what's intelligent to do" on behalf of someone else. "They exceeded that. Their heroism is a step beyond what any medal could recognize."

Tarantino appears uncomfortable with talk like that. When he and Thomas got Henson into the central courtyard September 11, Thomas tore Tarantino's nametag from his blouse and pocketed it. "Remember that name!" he told the still-groggy survivor. "Tarantino! That's who saved you!"

The doctor's leg-press rescue, Thomas said, was "the bravest thing I've ever seen." Tarantino downplays any heroics: "Once you've made eye contact with someone, you can't just leave them to die." He says his desperate leg-press maneuver was more a product of adrenaline than technique—like a mother who somehow lifts a car off a child. He sprained his knee in the effort—the next day he could hardly walk—and doubts he could have gotten Henson out without Thomas.

With a heavy heart, Thomas continued looking for his friend Bob Dolan, all the while grieving for what he feared Dolan's wife and children would have to face. "His cell phone kept ringing for a couple of days when we called it, so we had hopes," Thomas says. Dolan was confirmed among the victims; some remains were recovered. Last January 11, in the presence of Thomas and the Dolan family, he was buried at sea.

Ken Ringle is a staff writer and critic at the Washington Post.

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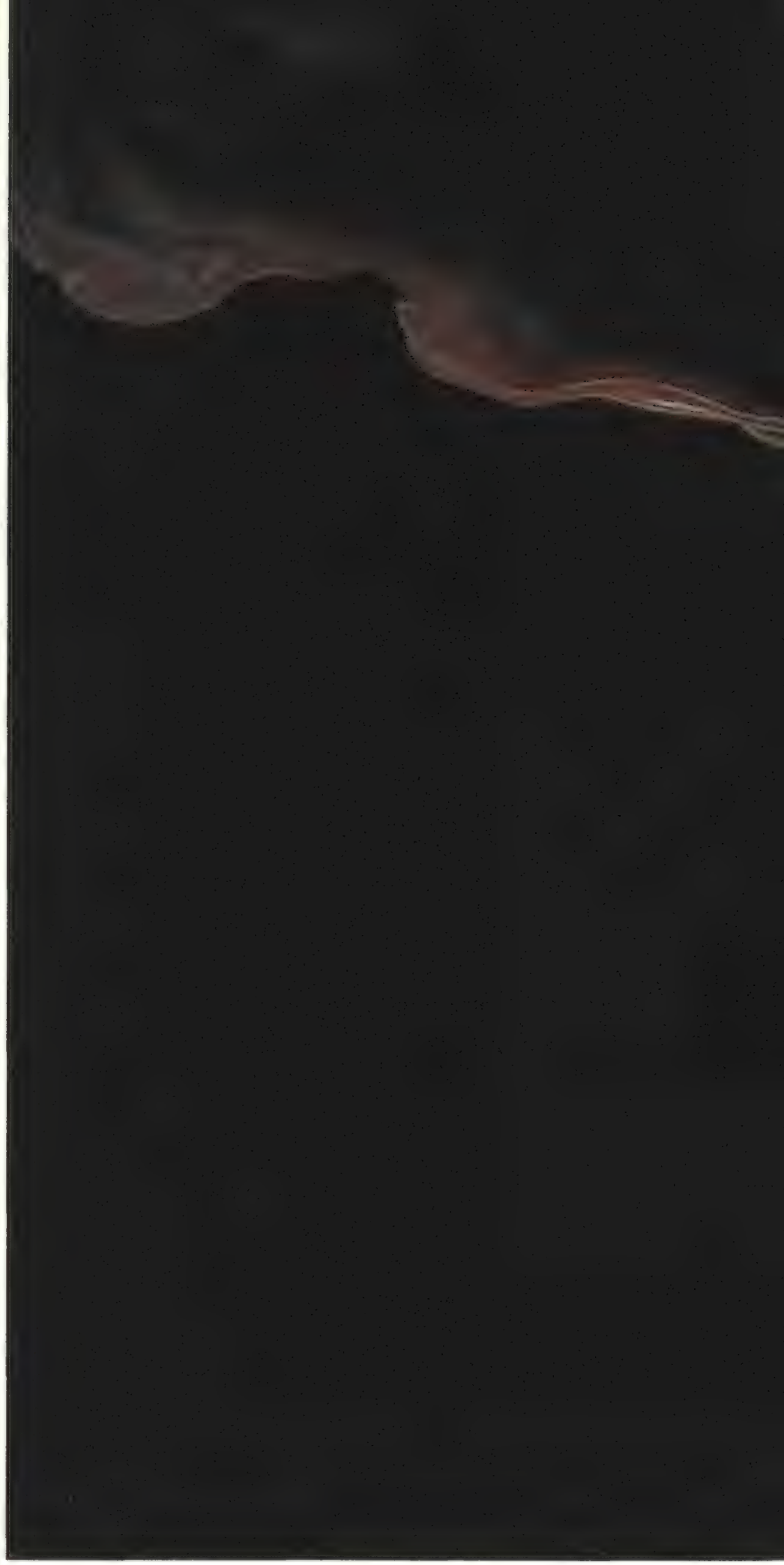
Eye in the Sky

A FRENCH PHOTOGRAPHER SETS OUT TO CAPTURE THE WORLD'S FRAGILITY AS WELL AS ITS BREATHTAKING BEAUTY

PHOTOGRAPHS BY YANN ARTHUS-BERTRAND

SINCE THE DAY IN 1978 WHEN HE FIRST photographed—from a hot-air balloon in Kenya—a family of lions as part of a study he and his wife, Anne, were conducting of lion behavior in the Masai Mara, French photographer Yann Arthus-Bertrand has amassed some 300,000 images from high above 80 countries. (Yemen, China and Saudi Arabia are the only nations that have not allowed him to photograph from on high.) The subjects are as familiar—people, landscapes, wildlife—as the perspective is compelling. But they also convey a subtle warning: that our magical earth is fragile, easily lost. That, at least, is Arthus-Bertrand's intention. He set out to create a portrait of the earth that not only reveals its remarkable beauty but also records the impact on it of people and technology. "Flying over the globe, I realize we don't account for much. We're part of the landscape, even if, nowadays, we have the ability to imprint our mark," says Arthus-Bertrand, 56. Because he records the precise geographic coordinates of each photograph, future generations can track changes in our ever-evolving planet. This month Harry N. Abrams, Inc., republishes his 1999 book, *Earth From Above* (with new images and essays by conservationists). The earlier edition sold some two million copies in 14 different languages. —*Marlane Liddell*



Crystalline Formation on Lake Magadi, Kenya

The Great Rift Valley extends 4,000 miles across East Africa, the result of a tear in the earth's crust 40 million years ago. A series of depressions stretching from the Red Sea to Mozambique and bordered by high volcanic plateaus, the valley contains a string of large lakes. This one, Kenya's Magadi, is very salty, due to rain that washes down neighboring volcanic slopes, picking up mineral salts along the way. In some places the water's surface is marbled with so-called licks (above), which form when salt crystallizes on the water's surface. Though inhospitable to man, the lake is filled with life; huge flocks of flamingos gather here to feed on microalgae and shellfish.

Military Cemetery of Notre Dame de Lorette, France

The nations of Europe sacrificed 8 million lives to World War I and 45 million to World War II before the words of French writer Victor Hugo (1802-1885) could even begin to sound prophetic: "No more armies, no more frontiers, a single continental currency. . . . The day will come when you will lay down your arms." In the Battle of Lorette, French and German forces struggled for a full year, from October 1914 to October 1915, for possession of a strategic plateau near the French town of Pas-de-Calais. This nearby cemetery, with its 20,000 crosses and an additional 22,000 unknown soldiers, honors Lorette's fallen.

Blue Lagoon near Grindavik, Iceland

The Blue Lagoon is an artificial lake fed by surplus water from the geothermic power station at Svartsengi on Iceland's Reykjanes Peninsula, a volcanic region filled with natural hot springs. The water—heated by magma to a temperature of 464 degrees Fahrenheit—feeds into the lagoon at a depth of more than a mile. By the time it reaches the surface it has cooled to 158 degrees F, still hot enough to heat neighboring towns through geothermy. After the heat-exchange process, it's just over 96 degrees F. Rich in mineral salts and organic matter, the Blue Lagoon's warm waters are renowned for their curative properties.

Cotton Worker, Ivory Coast

At the encouragement of the French—the ruling colonial power—the Ivory Coast began growing cotton in 1893. Initially, the crop was intended to serve only local needs. But by the beginning of the 20th century, it had become one of the country's largest exports, after cocoa and coffee. Cotton here is harvested by hand at a rate of 33 to 80 pounds per worker, per day, depending on the individual's age, size and experience. A metric ton of cotton yields 880 pounds of fibers and 1,200 pounds of seeds. The seeds are processed for human consumption (cotton seed oil) or fed to animals in cattle cakes. The fiber is the main cash crop in the Korhogo region of northern Ivory Coast, while the south grows primarily cacao, palm oil, rubber and pineapple.

Adélie Coast, Antarctica

With temperatures ranging from a high of 32 degrees F in summer to a low of -13 degrees F in winter, most of Antarctica's 4.5 million-square-mile surface area is covered by a layer of ice more than a mile thick. Quarter-mile-thick ice platforms that float on the sea extend the continent an additional 600,000 square miles. Despite the unforgiving climate, seals and many species of birds abound, including two-foot-tall Adélie and four-foot-tall emperor penguins, one of which can be seen on an ice floe above. Highly social, penguins issue an earsplitting contact call when separated from their flock, which can be heard for a half mile or more.

Fields of Tulips near Amsterdam, Netherlands

Every year in April and May, Holland dons multicolored garb when 800 varieties of tulips, the result of four centuries of cultivation, come into bloom. The first tulips appeared in the Netherlands in 1593 when Austrian botanist Carolus Clusius moved there from Vienna (because it was not a very hospitable place for Protestants) and planted a cache of the then-exotic bulbs brought to him from Turkey. Today, Holland produces 65 percent of the world's flowering bulbs—some 9 billion—and exports 59 percent of its cut flowers, making it the third (after the United States and France) largest exporter of agricultural produce in the world. Environmentalists' concern about pollutants has made the Netherlands an innovator in organic methods of cultivation.

YANN ARTHUS-BERTRAND/EARTH FROM ABOVE/PETER ARNOLD INC.

Expressway Interchange near Yokohama, Japan

Yokohama is Japan's second largest city (after Tokyo) and the largest port in Asia, handling one-fifth of Japan's imports and exports. The expressways that ring the city are typical of Western-style economies. Worldwide, there are an estimated 800 million cars and trucks, most of them in developed countries: nearly 30 percent are in the United States alone, while all of Africa has but 2.5 percent. (Japan has 5.8 percent.) Globally, the number of motor vehicles is expanding at a faster rate than the population.

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NO EXIT

AN ILLEGAL PET INDUSTRY IN INDONESIA IS PUSHING ORANGUTANS TO THE BRINK OF EXTINCTION IN THE WILD

PHOTOGRAPHS BY VIVIANE MOOS

THE HEAT OF THE TROPICAL SUN AND the smell of sweating bodies pervade the outdoor Jakarta animal market. Amid a cacophony of parrot chatter, the screams of monkeys and the barking of dogs, Willie Smits, dressed to look like a British oilman, and photographer Viviane Moos elbow their way through the crowd. Smits, a tall man with the demeanor and paunch of a person who doesn't ordinarily care about appearances, calls out in Indonesian, asking if anyone has orangutans for sale. The sea of people parts and a man appears with a red, furry baby orangutan clinging to his waist. It has large black eyes set in a heart-stopping, moon-shaped face.

But then events spin out of control. "It's him," shouts one of the men in the crowd, recognizing Smits. As head of the largest orangutan rescue organization in the world, Smits is hated and feared by people who trade in orangutans and other exotic animals. Although it's illegal to own one of these orangy-red apes on the Southeast Asian islands of Borneo and Sumatra (their last natural refuges) and in many other places, trade in the primate is brisk. An orangutan baby's adorable looks and similarities to a human infant make them irresistible pets. A big-bucks black market breeds violence, to which Smits is no stranger: he and his family frequently receive death threats, his three German shepherds have been killed and his house was set on fire with his wife, Syennie, and their three sons inside. (All escaped injury.) Even so, Smits continues to go to markets, confiscate orangutans and help police identify dealers in exotic animals.

"Take her camera! Pull the film out. Hit them!" cries one of the men. Smits, 45, sees several others reaching for stilettos in their pockets. "I'll buy it," Smits shouts, momentarily confusing the traders and causing them to back off. Although he doesn't like to encourage the trade by making a purchase, Smits thrusts a stack of rupiah worth about $325 at the man with the

ORPHAN PRISONERS: Illegally captured and sold as pets, orangutans are often abused. Emen (left) had her fingers chopped off by her owners for stealing eggs. Wary traders sell orangutans in open markets like this one (above) in Jakarta.

orangutan, grabs the quivering animal and pulls Moos with him into the crowd. "You can't come back here again," Smits says to Moos, who has been photographing the whole time. "They could *kill* you."

THE YOUNG ORANGUTAN NOW SAFELY IN Smits' care will end up at one of two rescue centers that he supervises on the Indonesian side of Borneo. (The other half of the island is Malaysian.) In 11 years, Smits has released some 400 rescued orangutans back into the wild, adding to a population estimated at between 15,000 and 20,000.

Moos, a photojournalist fascinated by stories of survival (see "Editor's Inkwell," p. 13), compares the trials of orangutan babies to those of Brazil's young street urchins, which she has also documented. Both, she says, "are orphans who desperately need a voice." Of all the great apes, a designation that also includes gorillas, chimpanzees and bonobos, the orangutan faces the most imminent danger of extinction. "At current rates of decline," says Robert Shumaker, an orangutan research biologist at the Smithsonian's National Zoo and a friend of Smits', "the orangutan will be gone from the wild in ten years or less."

Even Smits, the most effective champion of the orangutan, is not sanguine about the animal's chances. "When you see a baby orangutan for sale as a pet," he says, "you can assume that the mother was shot." To get one baby out of the forest alive, he calculates, three to five mothers would likely have been killed. Most uncaptured, motherless babies will die also, either from injuries, stress or despair.

Trade in illegal orangutans is not the only threat to the species. Sadly, orangutans share with Indonesian villagers a fondness for the rich alluvial forests along rivers, where large fruit trees thrive. These areas are often the first to be logged and cultivated, pushing displaced orangutans into often fatal interactions with humans. The loss of their habitat—the World Bank calculates that each year in Indonesia more than 5,000 square miles of forest are destroyed—and continuous poaching have decimated their numbers. Smits' Balikpapan Orangutan Survival Foundation (www.orangutan .com) reports that for each of the nearly 1,000 baby orangutans saved so far by the Forest Police, 5,000 disappear from the wild. Among them are some 3,000 reproductive females and 1,500 female babies.

Smits came to Indonesia in 1980, not as

MISSION IMPOSSIBLE: "The fact that we still have orangutans coming into our rehabilitation centers means that we have failed," says Willie Smits (far left), a Dutch scientist who leads a small group of conservationists that stands between the orangutan and its extinction in the wild. Far from discouraging this former tropical forest ecologist, his new charges, such as Jamiat (left), have caused him to redouble his efforts. Smits' work involves rehabilitating orangutans, assisting police in identifying traders in exotic animals, educating Indonesians about the primate's plight and lobbying to create wild parks. The 1,729,000-acre Mawas Reserve in Borneo, if approved, could provide habitat for as many as 3,000 wild orangutans.

a primatologist but as a tropical forest ecologist, advising the government on how to grow tropical hardwood forests on poor soil. He founded the Wanariset Forestry Research Station there in 1982. Nearly a decade later, the Dutch-born scientist had an epiphany. In a market in Balikpapan, a coastal town in the eastern part of Borneo, he happened across a tiny and obviously sick orangutan baby for sale. Though he continued on his errands, he couldn't stop thinking about the baby orangutan. When he returned several hours later to save it, he found the animal in its crate tossed on a pile of garbage. "She was gasping for breath," he recalls. "They thought she was going to die, so they just threw her away." When Smits picked up the crate, the orangutan's former owner chased and harangued him, demanding to be paid. Smits took the infant home, named her Uce (after the sound of her heavy breathing on the garbage pile) and nursed her back to health. As he became more familiar with orangutans, he realized that even a rehabilitated infant like Uce would not survive a release into the wild, because she had never learned the ways of the forest from her mother.

It was largely because of Uce that Smits established the Wanariset Orangutan Reintroduction Center in 1991 on the grounds of the forestry station. In 11 years, the center, which operates almost entirely on donations (the Indonesian government contributes 2 percent of its overhead), has taken in 1,000 orangutans. But Smits appears to be fighting a losing battle. "Over the last ten years the remaining wild population suffered more than a 50 percent reduction," he says. In 1997 and 1998, fires in the island's lowland rain forests forced hundreds of orangutan mothers and their babies into human settlements in search of food. Starving villagers shot and ate most of the adult females, caging the infants for later sale. "To have one disaster after another striking them and knowing that still so many are threatened this very instant fills me with deep sadness," says Smits. "I look

into their eyes and see fear, curiosity, love and hope."

The animals that come to Wanariset, and another center he established in 1999 in the south-central region of the island, are often not only traumatized emotionally from the loss of their mothers but have been physically abused as well. One orphan had her fingers chopped off for stealing eggs, while another could no longer walk because she had been chained beneath a house for years. At each center, new animals are given a full medical checkup, including screening for diseases such as tuberculosis and hepatitis B, which orangutans can contract from humans. Each orangutan is fingerprinted and fitted with a tiny identifying chip under its skin. Local women act as surrogate mothers, providing round-the-clock care (for the very youngest) and a nurturing environment that can restore body and spirit. Eventually, many orangutans will be transferred to large tracts of protected forest where food is supplied; these areas act as halfway houses. The orangutans spend from six months to several years there, their food placed higher and higher in trees to encourage them to climb, as they must do in the wild.

Orangutans are the only great apes that spend most of their lives in tree canopies up to 150 feet above the ground, navigating like master climbers.

A NEW LIFE: Rescued orphans, such as 3-month-old Putto (left), receive a complete physical examination, plus fingerprinting (top), when they arrive at Smits' rehabilitation centers in Borneo. Danish scientist Lone Droscher-Nielsen and her husband, Odom, distract Gayo (above), who suffers from chronic dysentery, so they can give him intravenous rehydration. Lone felt that Gayo, who was too sick to go back to the forest, missed the Indian movies and soccer matches he watched on television when he was a pet in an Indonesian home. "So we let him watch a little TV," she says, "and he put on a little weight."

Their red hair absorbs most of the light that manages to penetrate the forest canopy, making them exceedingly difficult to spot, much less observe, which is one reason biologists know more about gorillas and chimps than they do about orangutans.

"Most people think that if you let an orangutan loose in the forest, it will know what to do naturally," says the Smithsonian's Shumaker. "That is wrong. Orangutan juveniles aren't genetically programmed—they must be taught about their environment, just like humans." Orangutans have the slowest rate of reproduction among mammals—the gestation period is 8 1/2 months, but eight years can pass between births—time a young orangutan uses to learn from its mother the skills necessary to survive in the complex rain forest environment. Over the course of her life, an orangutan will give birth only two or, at most, three times.

This makes rehabilitating an orangutan taken from its mother at an early age exceedingly difficult. "How do you teach an orangutan to be an orangutan?" Smits asks. He and the large entourage of caregivers who keep his facilities running are still learning what makes an orangutan tick, an effort that has become even more urgent now that time seems to be running out. "We know that orangutans pass along information from one generation to another, but exactly how remains little understood," says Shumaker. "Learning about their cognitive functioning could make a big difference in rehabilitating them."

RECENTLY, SMITS CHECKED IN ON UCE, 13 years after rescuing her, who following years of education, lives wild and free in the Sungai Wain forest not far outside Balikpapan. Before he arrived, she had been spotted in the trees, but staff members couldn't even get close enough to take her picture. Seeing Smits, Uce carefully climbed down and introduced him to her son, whom staffers named Bintang, meaning "star." (In July, she gave birth to a second baby.) As for the infant that Smits hastily bought in the market, he, too, is expected to be released into the wild this month. Two small but sweet victories in a likely losing battle. —*John F. Ross*

GLIMMERS OF HOPE: Two-and-a-half to five-year-old orangutans that pass through the rigorous program at the Nyaru Menteng Reintroduction Center get released to Midway House, a large stretch of protected peat swamp forest (left), where they interact with other animals their age and slowly begin to learn survival skills. Those that make nests and learn to find food graduate to a wilder forest on nearby Kaja Island. The cost of reintroducing an orangutan is about $4,500. Longtime caregiver Ulla von Mengden (at far left with Nitnot) has helped Willie Smits create a new primate center at the Jakarta zoo, where many thousands of Indonesians learn about the plight of the only great ape found in the wild outside Africa.

MadamMontessori

FIFTY YEARS AFTER HER DEATH, INNOVATIVE ITALIAN EDUCATOR MARIA MONTESSORI STILL GETS HIGH MARKS

BY NANCY SHUTE

SIX-YEAR-OLD SHARI AND HER 5-year-old classmate Ugochi are adding 1,756 and 1,268. They've penciled the numbers neatly into their notebooks, but the method they're using to come up with the answer—3,024—isn't something you'd see in most American schools, let alone kindergartens. Each little girl loads a wooden tray with gold beads. Sprawled on a mat on the floor, they combine six of Shari's beads and eight of Ugochi's. "Nine units, ten units!" Ugochi counts triumphantly. With that, she scoops up ten beads and skips across the room to a cabinet, where she trades them in for a "10 bar"—ten beads wired together. Now the girls count in unison: "five 10s, six 10s, seven, eight, nine, ten 10s!" Then, pigtails flying, they run to trade in the 10s for a 100.

The 21 other children in the class at the public Matthew Henson Elementary School in Landover, Maryland, seem equally energetic as they follow their own independent agendas. Five-year-old Taiwo lays out wooden letters that spell "May is back. I am happy." Nearby, two 4-year-old boys stack pink blocks, watch them topple, then stack them again, this time with the larger ones on the bottom. A 3-year-old uses a cotton swab to polish a tiny silver pitcher—a task that refines motor skills—while a 5-year-old gets herself a bowl of cereal, eats it at the snack table, then cleans up everything.

Nearly a century ago, a young Italian physician imagined that children would learn better in a classroom like this one—a place where they could choose among lessons carefully designed to encourage their development. Since then, the views of Maria Montessori, who died 50 years ago this year, have met with both worldwide acclaim and yawning indifference. Her method, which she developed with the children of Rome's worst slum, is now more commonly applied to the oft-pampered offspring of the well-heeled. Montessorians embrace Maria and her ideology with a fervor that often borders on the cultlike, while critics say Montessori classes are either too lax and individualized or, paradoxically, too rigidly structured.

"Her ideas were so radical," says Mary Hayes, general secretary of the Association Montessori Internationale (AMI). "We're still trying to convince the world that this is the best way for children to grow."

TEACHER ROSEMARY BEAM ALCOTT SITS ON the floor with Ugochi and Shari, who show her their notebooks. "Did you exchange your 10 ones for a 10 bar? Did you carry? Did you write it down? How many 100s do you have?"

"None," Ugochi replies.

"That's great!" says Alcott.

She turns to Taiwo. "May is back. I am

A doctor before she became an educator, Maria Montessori (above, at age 16) developed strategies and materials that, a century later, are being adopted by more and more classrooms (such as this one in Landover, Maryland).

In 1935, Anne Frank (about age 6, at corner desk in rear of classroom with three boys) attended a Montessori school in Amsterdam.

happy. Me is flowers," the child and teacher read together.

"It doesn't make sense," Alcott says. Taiwo giggles.

Back to the mathematicians. "Ugochi, please show me a 3 going in the right direction." Ugochi erases, and writes again. "Good job! OK, put the beads away. I'm going to give you another problem."

Back to Taiwo, whose letters now read, "May is back. I am happy the flowers smell good."

"Wow!" exclaims Alcott. "What a wonderful story."

Now a 5-year-old boy brings her his work. Using pieces from a wooden puzzle, he has traced the states around Texas on a piece of paper, colored them, copied labels and pasted them onto his new map. "Louisiana, Arkansas, Oklahoma, New Mexico," reads Alcott. "Very good!"

MONTESSORI'S OWN LIFE WAS FRAUGHT WITH CONFLICT and controversy. Born in 1870, of genteel origins, she fought doggedly for the right to study medicine, becoming Italy's first female physician. Yet she abandoned medicine to embrace education, a profession she had once scorned.

An outspoken advocate of women's rights, for years she hid the fact that she was the mother of an illegitimate child. Little Mario was sent to a wet nurse in the country and later to boarding school. It wasn't until he was 15, and Montessori's own mother had died, that she publicly acknowledged her son and brought him to live with her.

Yet whatever her personal travails, Montessori's educational vision has not only survived into a new century, it is thriving as never before. Many of her once-radical ideas—including the notions that children learn through hands-on activity, that the preschool years are a time of critical brain development and that parents should be partners in their children's education—are now accepted wisdom. "She made a lasting contribution," says David Elkind, professor of child development at Tufts University and author of *The Hurried Child*. "She recognized that there was an education particularly appropriate to young children, that it wasn't just a smaller-sized second grade."

Indeed, a half century after her death, Montessori methods are used increasingly in public schools like Henson, in Prince George's County, Maryland, where 400 children are on a waiting list for Montessori classes. The county adopted Montessori in 1986 as part of a school desegregation program, and parents have fought hard to keep it.

Doris Woolridge, who has three daughters, including Shari, in Montessori classes at Henson, believes the system can hold its own, even in this era of increased emphasis on standardized exams. "To see a 5-year-old adding into the thousands—I'm just amazed," says Woolridge, an attorney for the District of Columbia. "I saw them working with the beads, and they learned so quickly." Among other things, Woolridge approves of the Montessori idea of multiage classrooms. "The younger kids mimic the older kids," she says, "and the older ones help lead the class."

ANNE FRANK FONDS, BASEL/ANNE FRANK HOUSE, AMSTERDAM/GETTY IMAGES

"I am not famous because of my skill or my intelligence," she wrote, "but for my courage and indifference."

Perhaps none of Maria Montessori's ideas sound as revolutionary now as they once did, but in her time she was a breaker of barriers. Born in the Italian province of Ancona, she grew up in a time when teaching was one of the few professions open to educated women. Her father, an accountant, urged her to take that path, but her mother supported Maria's insistence, at age 12, that she attend a technical school to study mathematics. In her teens, Maria further tested her father's patience by considering becoming an engineer. She gave that up only because she decided to be a doctor.

University officials finally surrendered to her persistence, but Maria's fellow medical students shunned her, and she was allowed to perform dissections only at night, alone, because it was unthinkable that men and women would view a naked body together. In 1896, at age 25, Maria completed her medical degree. "So here I am: famous!" she wrote to a friend. "It is not very difficult, as you see. I am not famous because of my skill or my intelligence, but for my courage and indifference towards everything."

Fame, however earned, had its privileges. Later that year, Montessori was asked to represent Italy at an international women's congress in Berlin. The press swooned over the charming, bright-eyed young doctor who called for equal pay for women. "The little speech of Signorina Montessori," wrote one Italian journalist, "with its musical cadence and the graceful gestures of her elegantly gloved hands, would have been a triumph even without her medical degree or her timely spirit of emancipation—the triumph of Italian feminine grace."

Landover, Maryland, Montessori student Jephthe Cadet, age 4, loves his numbers.

Back home in Rome, Montessori began caring for private patients and doing research at the University of Rome's psychiatric clinic. At the asylum, she came in contact with children labeled "deficient and insane," though most were more likely autistic or retarded. Locked all day in barren rooms, they would scuffle over crumbs of bread on the floor. Observing them, Montessori realized that the children were starved not for food but for stimulation. That set her to reading widely, in philosophy, anthropology and educational theory. Mental deficiency, she decided, was often a pedagogical problem. Experimenting with various materials, she developed a sensory-rich environment, designing letters, beads and puzzles that children could manipulate, and simple tasks such as mat weaving that prepared them for more challenging ones. After working with Montessori for two years, some of the "deficient" children were able to read, write and pass standard public-school tests.

If retarded children could conquer such exams, Montessori wondered, what results would her methods have on normal youngsters in traditional classroom settings? She visited schools and found students "like butterflies mounted on pins," she wrote, "fastened each to his place, the desk, spreading the useless wings of barren and meaningless knowledge which they have acquired." Montessori's own barely formed vision combined Jean-Jacques Rousseau's philosophy of the nobility of the child with a more pragmatic view that work—and through it the mastery of the child's immediate environment—was the key to individual development.

To do that, she maintained, each child must be free to pursue what interests him most at his own pace but in a specially prepared environment. Montessori's chance to act on her philosophy came in 1906 when a group of real estate investors asked her to organize a program for the children in Rome's downtrodden San Lorenzo district so that the children, whose parents were off working all day, would not deface building walls. The investors gave Montessori a room in one of the buildings and 50 preschoolers, ages 2 to 6. Her medical colleagues were amazed that she would involve herself in something as mundane as day care, but Montessori was undeterred. She asked society women to contribute money for toys and materials and hired the daughter of the building's porter to assist her.

The Casa dei Bambini, or Children's House, opened January 6, 1907. At first, Montessori just observed. She noticed that the children came to prefer her teaching materials to toys and would spend hours putting wooden cylinders into holes or arranging cubes to build a tower. As they worked, they became calmer and happier. As the months passed, Montessori modified materials and added new activities, including gardening, gymnastics, making and serving lunch, and caring for pets and plants. Children who misbehaved were given nothing to do.

P. 70 ASSOCIATION MONTESSORI INTERNATIONALE, AMSTERDAM; PP. 71 AND 73 KAY CHERNUSH

An advocate of women's rights, Montessori hid that she was the mother of an illegitimate child.

The children soon started asking Montessori to teach them to read and write. So she devised sandpaper letters that they could touch and trace, pronouncing the sounds as they did so. One day during recess, a 5-year-old boy cried excitedly, "I can write!" and wrote the word *mano*—hand—with chalk on the pavement. Other children began writing, too, and news of the miraculous 4- and 5-year-olds who taught themselves to write traveled quickly.

Acolytes from around the world flocked to Rome to sit at Montessori's knee, and soon Montessori schools were popping up in Switzerland, England, the United States, India, China, Mexico, Syria and New Zealand. Alexander Graham Bell, who had started his career as a teacher of the deaf, was fascinated by Montessori and in 1912 established a Montessori class in his Washington, D.C. home for his two grandchildren and a half-dozen neighborhood kids. A Montessori class, taught in a glass-walled classroom, would be one of the most popular exhibitions at the 1915 Panama–Pacific International Exposition in San Francisco.

"Education," wrote Montessori (in hat and coat in London in 1946), "is acquired not by listening to words but by experiences."

But success proved more than even Montessori could handle. Though she had resigned her university chair to concentrate on the schools, she found herself overwhelmed by the demands for lectures, training and interviews. She complained bitterly about books describing her program and insisted that only she was qualified to train teachers. The fact that she had patented her teaching materials irked more than a few critics, one of whom decried the act as "sordid commercialism."

Other educators also raised questions. Most prominent among them was William Heard Kilpatrick, a disciple of John Dewey, who dismissed Montessori's methods as too formal and restrictive, failing to spark children's imaginations sufficiently. By the 1920s, interest in Montessori had waned in the United States.

A Montessori revival began in the late 1950s, led by Nancy Rambusch, a mother frustrated by the lack of choices for her children's education. After going to Europe for Montessori training, she started a school in Greenwich, Connecticut. Others followed. Today, there are some 5,000 Montessori schools in the United States, some affiliated with AMI, others with the American Montessori Society, founded by Rambusch. Some schools using Montessori methods are not certified at all, and some that claim to use them do anything but. The little research that exists on the benefits of the method indicates that Montessori students do well in the long term, but more research is needed. "We have to verify that we're in tune with brain development, and that our kids are prepared at all levels," says Jonathan Wolff, a Montessori teacher and consultant in Encinitas, California.

Lilian Katz, professor emerita of early childhood education at the University of Illinois, says the criticisms of Montessori's methods—obsession with the "correct" use of blocks and beads, the lack of emphasis on fantasy and creativity—are valid but don't compromise the value of the program. "It's pretty solid," says Katz. "The strategies the teachers use are very clear. Children seem to respond well."

With pinched budgets, little time for recess or music, and increased emphasis on standardized tests, these are tough times in education. But Maria Montessori's legacy has never been more valued, even as it adapts to meet the needs of a new century. For some teachers, says Paul Epstein, head of the Chiaravalle Montessori School in Evanston, Illinois, "the materials have become the method. But you can do Montessori with a bucket of sticks and stones or any set of objects if you know the principles of learning." Epstein's middle school students don't play with blocks. Instead, they're doing something Maria never imagined, but doubtless would like. Last year, they ran the school's snack bar, a hands-on task designed to help them with skills they will need as adults: common sense and time management. Says Epstein with a smile: "They're learning to be entrepreneurs."

Nancy Shute, a frequent contributor, last wrote for SMITHSONIAN *about the surge of interest in genealogy.*

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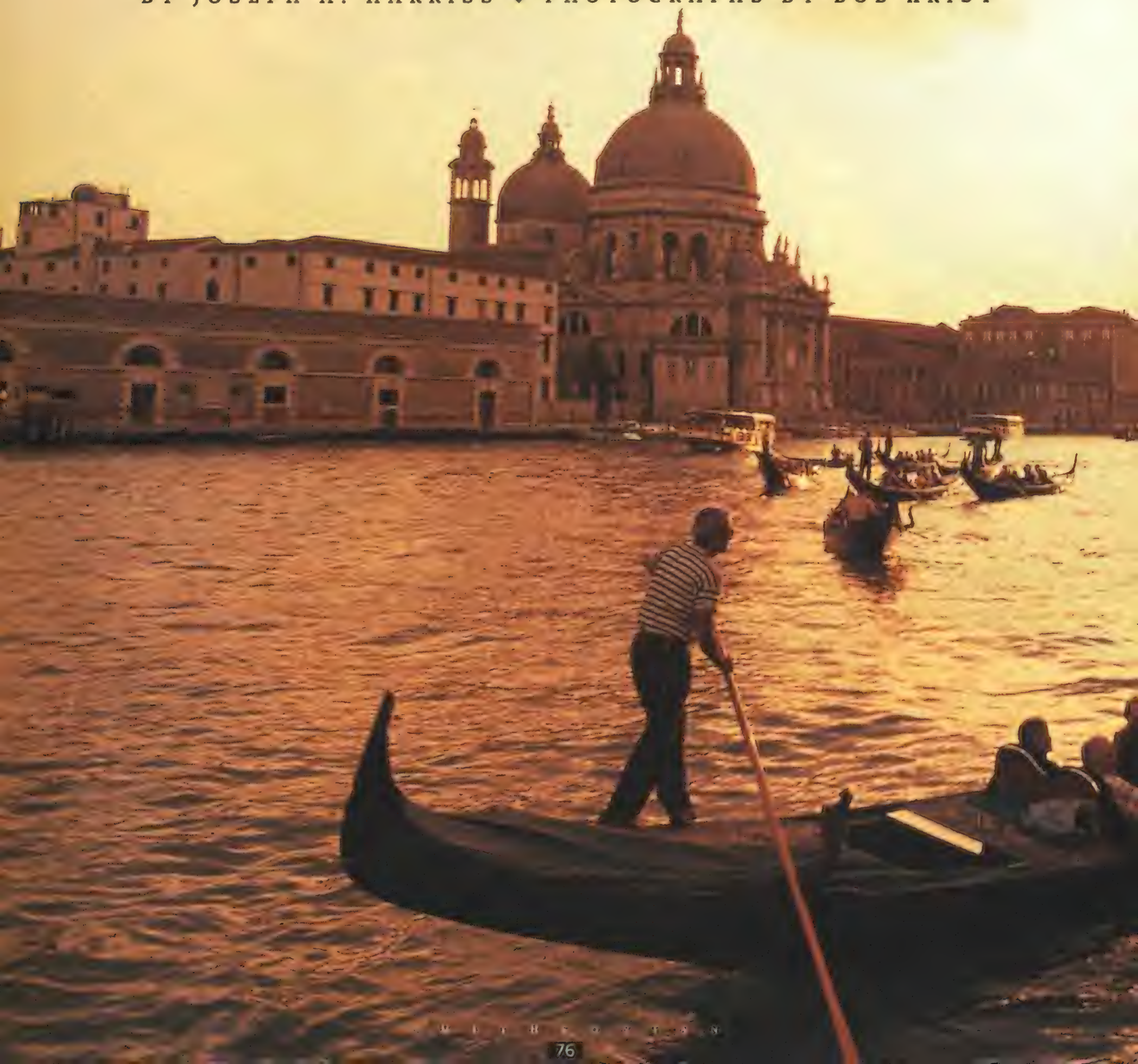
Turning the Tide

VENICE HAS DEFIED THE ONSLAUGHT OF THE SEA FOR CENTURIES. BUT AS WATER LEVELS RISE AND FOUNDATIONS ERODE, VENETIANS MUST SEEK OUT NEW WAYS TO SAVE THE CITY'S FABLED ARTWORKS AND ARCHITECTURAL TREASURES

BY JOSEPH A. HARRISS ◆ PHOTOGRAPHS BY BOB KRIST



Part of Venice's allure lies rooted in traditions that survive despite the deluge of tourism threatening to dilute the city's authentic culture. Like his predecessors did even centuries before, Angelo Scola, the new Patriarch of Venice (in the center boat with two gondoliers) leads a welcoming procession down the Grand Canal.

Some in our crew said it was luck. Others, with a wink, called it a miracle. In any case, just as Angelo Scola, the newly appointed 47th patriarch of the Roman Catholic patriarchate of Venice, began his ceremonial procession down the Grand Canal this past March, the thick fog that all morning had shrouded the city's marbled palaces and Byzantine domes suddenly lifted. With the sun shining a benediction on the flotilla, boaters in striped shirts from Venice's 42 rowing clubs jockeyed for position. I was seated in the *San Marco*, a handsome *gondolone*, or oversize gondola, with eight rowers, one of whom was the captain, Lino Farnea. Amid the mostly good-natured traffic jam, Farnea maneuvered us into the wake of the prelate's gleaming black gondola. We glided along Venice's curving, two-mile main thoroughfare, passing candy-striped mooring posts and the Venetian gothic facade of the 15th-century Ca' d'Oro palace, home to a priceless collection of sculpture and paintings, before slipping beneath the stone arches of the 16th-century Rialto Bridge.

PATRIARCHATE OF VENICE; MAP: ELIZABETH WOLF

This was the real thing, not a tourist attraction. On one balcony, two elderly ladies held up an icon of the Madonna for a blessing. Crowds on the canal's banks and bridges waved white balloons, crying "*Viva el Patriarca!*" and, more familiarly, "Angelo, Angelo." Reclining on the stern of a gondola carrying a grandly uniformed carabiniere, an indolent dog appeared unimpressed. We passed the low white building of the Peggy Guggenheim Collection, where one of the world's finest displays of modern art is housed in a former 18th-century palace, and then the splendidly domed, octagonal Santa Maria della Salute church, built in thanksgiving for the end of a devastating 17th-century plague. The Grand Canal widened into the San Marco basin, sparkling with Venice's special Adriatic light, and the pink facade and pointed arches of the Ducal Palace came into view. Five bells rang out from the 325-foot-tall brick and white stone Campanile at St. Mark's Square, trumpeters in medieval-style burgundy tights sounded fanfares and rowers standing in their boats hoisted their long oars in salute. As the patriarch disembarked on St. Mark's Square, he encountered the morning's only false note—an improvised, hand-painted banner demanding, "*Stop moto ondoso!*": Stop motorboat wakes.

The event seemed to sum up today's Venice, ever the haughty if troubled *La Serenissima* (the most serene republic) and, almost despite itself, one of the world's prime tourist attractions, with some 12 million visitors a year. In this case, the problem concerned wave motion churned up by powerboats of every description, from public transport vaporettos and water taxis to cruise ships as tall as eight-story buildings. Moto ondoso is blamed for undermining the foundations of canal-side buildings, not to mention buffeting gondolas and their passengers about, occasionally even tossing an unwary gondolier into the drink.

To be sure, Venice has plenty of problems to choose from. The usual jeremiad starts with the parlous condition of its ancient buildings, monuments and art treasures. Then there's the exodus of its citizens, with the population dropping faster than that of any other shrinking Western European city: from 151,000 in 1951 to a bit more than 60,000 today. The lack of a modern sewage system—Venetians still count on the tides to flush waste out of their canals—capable of handling the extra burden of tourists is something else to worry about, as are the ubiquitous and acidic pigeon droppings, which can eat into stone. Worst of all, the gloomy refrain goes, the city is sinking and the oceans are rising. It's as if Thomas Mann's melancholy novella, *Death in Venice*, set the tone for our perceptions: "This was Venice, this the fair frailty that fawned and that betrayed, half fairy-tale, half snare."

ONE OF THE MORE thoughtful bemoaners of the city's fate is Gherardo Ortalli, professor of medieval history at the University of Venice. "Venice is becoming a beautiful museum and a fine place for the carnival, but it's no longer a real, living city," he tells me in his office near the Campo Santa Maria Zobenigo, whose 17th-century church has one of the finest Venetian Baroque facades in a city full of such marvels. "We used to have our own peculiarly Venetian way of being born, getting married and dying," he says, pausing to adjust a window shade. "Now all that is ending. Try to buy an apple or an orange around St. Mark's—all the shops sell is junk for tourists. Or take our main post office, which used to be the Fondaco dei Tedeschi, a splendid international trading center on the Grand Canal that's been a landmark since the Middle Ages. Now it's been sold to become another hotel."

The professor's lament is echoed by Donna Leon, the spirited American author of a dozen well-crafted crime novels

Her laurel wreath designates a new doctoral graduate (top), who is traditionally expected to celebrate with rambunctious and bawdy festivities that include the hurling of raw eggs and flour. Produce vendors in Rio di San Barnaba load cargo boats for use as floating grocery stores (above). The bobbing markets are a welcome alternative for merchants to Venice's high commercial rents.

If it's not one thing, it's another: Venice's ubiquitous pigeons—estimated at 120,000—threaten the city's architectural treasures (such as St. Mark's Basilica, above), as the tons of acidic guano the pigeons dump each year in the city erode stone facades already under assault by advancing high tides.

set in Venice who has lived there for 20-odd years and speaks cheerfully of her unrelieved pessimism about the place. "You can't help noticing the change in the quality of life here, the increasing artificiality," she says. "The guy who used to sell me bread is gone, and his shop is now a mask store for tourists. Who wants to live in Disneyland? The rate of change is increasing, and I think it's irreversible."

And yet, and yet . . . for all its problems and artifice, what strikes me on a visit after a long absence is how much vibrant life remains. I still see no reason to disagree with another description of Venice, written by novelist Evelyn Waugh: "Venice, with all its complexity and variety, is in itself the greatest surviving work of art in the world."

Naturally, tourists come to Venice for its star attractions. The Byzantine-style St. Mark's Basilica, gleaming with gold mosaics and precious stones, houses the remains of Saint Mark the Evangelist beneath its high altar. Nearby stands the magnificent Ducal Palace, with its coffered, gilded ceilings and its elegant white stone Bridge of Sighs (so named for the sighs emitted by prisoners as they crossed over to the dungeons) leading from the palace to the prison. Every year, millions of visitors view the city's more than a hundred ornate churches, filled with artistic treasures from the Italian Renaissance, and frequent such unique museums as the Accademia, packed with monumental works by celebrated Venetian painters like Giovanni Bellini, Tintoretto, Titian and Veronese. Cultural duties done, crowds still flock to the cafés of the vast, colonnaded St. Mark's Square, where they sip rich coffee or

spoon a gelato while gazing up at St. Mark's emblematic lion perched atop a soaring granite column, its wings looking tacked-on and its expression more goofy grin than snarl.

But Venice's irresistible charm also lies in things like the steel prow, or *ferro*, of a gondola, flashing like a heliograph in the setting sun; redbrick bell towers whimsically out of plumb; a young woman laboriously bumping a baby carriage up and down the steps of a canal bridge; and a young man with a laurel wreath around his neck (symbolizing his new doctoral degree), trailed by family and friends gaily shouting "*dottore! dottore!*"

I also relish the complex Venetian character—typically dignified, courteous and slightly dispirited, yet quick with sardonic retort. So I was not too surprised to hear Ortalli, after he had run through his list of complaints, then tell me how much he loves the city: "There's a real sense of community here, and that's traditional in the history of Venice," he says, brightening. "It's both a village and a big town, where my friends are so close I can go see them on foot."

Another optimistic Venetian is Aurelio Latella. A 42-year-old consultant on air pollution, the Rome native holds a degree in analytical chemistry from Rome University. But he fell in love with Venice and decided to move here three years ago with his partner, Marina. They bought a dilapidated apartment in a 300-year-old building and have been lovingly renovating it into a handsome duplex with original marble floors and beamed ceilings. "It's true that the city has been losing population for a couple of decades," Latella says over a plate of steaming pasta he has cooked up in his new kitchen. "But there's also an influx of younger people like me who are really committed to making Venice work." He gestures at his apartment. "Would we be doing this if we thought Venice was going to sink?"

FLOODS ARE ACTUALLY ONE OF VENICE'S oldest traditions, dating at least to the year 527, a century after the city was founded on March 25, 421—at noon, exactly, local legend asserts. According to journalist John Keahey's recent book, *Venice Against the Sea*, the city's streets were about six feet under water in 1240. A flood in 1268 drowned many citizens in their homes, while others succumbed to the cold. In following centuries, city authorities repeatedly had to reinforce with seawalls and other measures the barrier islands that protect Venice from the Adriatic.

"The sea level around Venice has varied over the centuries," says Paolo Canestrelli, the low-key head of the city's Ufficio Maree, or Water Authority. "Pavements have been raised several times. You can see that at the shortened bases of some church columns, and also at wellheads, which no longer have steps leading to them." In Venice, relative sea level—that is, the combined effect of sinking land and rising oceans—is estimated to have increased steadily between 400 and 1900, at about five inches a century.

But instrumental measurements of

Because St. Mark's Basilica is on the lowest point in Venice, *acqua alta*—unusually high water—is all too common, occurring some 50 times a year. To handle the situation, street-sweeping crews assemble elevated walkways throughout the square when waters start to rise. "It's a nuisance but not tragic," says longtime resident Gherardo Ortalli. More problematic to some Venetians is *moto ondoso*, waves created by all manner of powerboats.

AFP/CORBIS

With 12 million visitors a year creating tons of garbage, street sweepers must start early to clean the Molo, the south edge of St. Mark's Square. Lacking landfill space, Venetians barge their trash to the mainland.

Aurelio Latella, his partner, Marina, and their 3-year-old son, Tommaso, are part of a wave of young homeowners rejuvenating an otherwise shrinking population. Latella moved into a centuries-old building this past February and is restoring two floors that went uninhabited for 20 years. "I think we are going to reverse the trend and bring new life to Venice," he says.

tides, begun in 1872, show that relative sea level in Venice has risen much faster in the 20th century, to about a foot in 100 years. One reason for the acceleration is apparent when Canestrelli opens a book of graphs tracing tidal levels. As one graph shows, water levels in Venice are about the same now as in 1970, when nearby industries stopped the pumping of aquifers under the city. During the pumping, which started in 1930, Venice sank almost four inches because the subterranean support provided by the groundwater no longer existed. That settling was about the equivalent of two and a half centuries of sinking due to purely geological factors. "For us," says Canestrelli, "the pumping and consequent sinking have been a much bigger problem than rising ocean levels."

To literally get a better picture of historic sea levels before instrumental measurements, Dario Camuffo, a climatologist at the Institute of Atmospheric Science and Climate in Padua, has looked to an unexpected source: the luminous, extremely detailed 18th-century paintings of Venice by the aptly named Giovanni Antonio Canal, known as Canaletto.

Canaletto's paintings form an unusually accurate record of mid-18th-century Venice, Camuffo explains, because, like some other painters of the era, he probably used a camera obscura to project traceable images onto a sheet of paper or canvas (see "Mirror Images," SMITHSONIAN, February 2002). The artist brushed in colors and added a few human figures, producing the equivalent of today's postcards. "We know he was accurate because Venetian buildings of his day had dark crusts of smoke pollution in places not washed by rainfall, and he included that," says Camuffo. "More important, he also included the greenish brown algae that thrives on canal walls wet twice daily by tides. My team and I took new photographs from the original viewpoint of each painting and superimposed them on the painting to see the difference, using computer graphics where necessary to correct optical distortions or effects of

TOP: NATIONAL GALLERY, LONDON

perspective." According to Albert Ammerman, a Colgate University archaeologist who has studied sediments to understand the historic rate of Venice's sinking, relative sea level during Canaletto's time was probably about 20 inches lower than today's. Camuffo's study of Canaletto's paintings appears to confirm this.

The causes of flooding are complicated, but the effects are clear, especially at St. Mark's Square, both the lowest and most popular spot in the city. According to John Keahey, a century ago the square was covered by high tides only 7 times a year. That number rose to 20 times a year in the 1950s and now occurs an average of about 50 times annually. To keep the floods from short-circuiting the whole city, the local electric company had to elevate its transformers in the late 1960s and put household electric plugs six feet above mean sea level.

For Adriano Girardi, manager of the sumptuous, centuries-old Quadri café and restaurant on the square, the sounding of the sirens signaling *acqua alta*, or extreme high tide, means going into action, bringing in the outdoor tables and chairs from the square and stacking the more valuable indoor tables on them in the downstairs coffee rooms. After waiting for up to eight hours for the tide to recede, his team then squeegees the water off the floors, rinses everything with soap and fresh water and replaces the furniture. "Last year we had it about 60 times, and we lose half a day every time it happens," he told me over cappuccino. "On average, it costs us about one month's revenue per year."

A plan exists to protect St. Mark's Square from such flooding by modernizing the network of pipes and drains beneath the square and undercoating it with a waterproof membrane. But until then, Girardi will keep on moving and stacking furniture and providing boots for customers trapped by a surprise flood. Quadri employees escort the booted patrons to the nearest dry spot and then bring the boots back to the restaurant. "It becomes fun for a lot of the customers," Girardi says. "And I guess they really like the boots. I started with 70 pairs a couple of years ago, and now I'm down to 22."

To determine how much the water has risen over the centuries, climatologist Dario Camuffo compared contemporary photographs of the entrance to the Cannaregio Canal (above) with the same scene Venetian painter Canaletto captured in accurate detail in the 1730s (opposite). Higher bands of algae on today's buildings testify to a rise of about 20 inches since Canaletto's day.

Girardi was not in Venice for the big one—the historic acqua alta of November 4, 1966, which reached six feet above mean sea level, flooding Venice's center for 15 hours and putting St. Mark's Square under nearly four feet of water. Because of a disastrous confluence of circumstances—heavy rain, a full-moon tide, a low-pressure system over the area, and a strong wind pushing the Adriatic into the lagoon—the flood shut down the city's electricity and telephones for a week and washed through ground-floor homes and businesses. No one died, but rat carcasses by the thousands floated in the canals, along with mattresses, furniture and other debris.

ALTHOUGH THE PROBABILITY OF SUCH A flood is calculated as once in every 140 years, after 1966 saving Venice suddenly became chic. The Italian government made it a "preeminent national interest," and has since committed some $4 billion to public works and studies. It also gathered about 50 Italian engineering and construction companies to form the Consorzio Venezia Nuova (CVN), or New Venice Consortium, to come up with technical solutions and build necessary infrastructure.

The CVN's answer to the problem is an innovative, $3 billion barrier of 79 mobile floodgates, each measuring 65 feet wide

Quadri café manager Adriano Girardi (in the restaurant's Grand Salon) displays the boots that he provides to his customers during episodes of acqua alta. The Grand Salon, on the ground floor of the centuries-old café, has endured more than a thousand flooding tides, which have become more frequent in recent years. Today, when the salon takes on water, patrons repair to an upstairs room to finish their meals.

and 65 to 100 feet long. Positioned at the lagoon's three Adriatic entrances at Malamocco, Chioggia and Lido, the water-filled barriers would lie flat on the seabed and thus be invisible from above the surface. When a tide more than 40 inches is forecast, the gates would be activated, with compressed air forcing the water out of the gates. Their consequently increased buoyancy would allow the gates to pivot upward on their seabed hinges to block the rising waters. Prime Minister Silvio Berlusconi's cabinet gave the green light last December to start the definitive design phase of Project MOSE, as it is known, after history's most famous divider of the waters. Final approval of the project, which has plenty of critics and has endured decades of debate, is not likely to come for several years. (For more information, see the NOVA program, airing in November on PBS, on the future of Venice.)

The gates are not the only project to save Venice. The CVN has strengthened Venice's natural barriers against the Adriatic. "We've shored up barrier islands with 15.7 million cubic yards of sand," says Alberto Scotti, managing director of Technital, the CVN's lead engineering firm, and the gates' designer. "We're also protecting the lagoon by stopping erosion and rebuilding marshlands."

Within Venice itself, workers have restored 113 out of its 450 bridges, while dredging the canals and rebuilding their walls. In addition, pavements along the canals are being raised by as much as a foot. And the canal dredging is already showing results. "The water quality in the canals is definitely improving," notes Rinio Bruttomesso, head of the Venice-based International Center of Cities on Water. "You can occasionally see fish and crabs in them, and even the odd cormorant, which hasn't been seen in Venice in decades. That's a good sign."

There's also a plan to reduce the effects of moto ondoso, thanks in part to studies by the Massachusetts-based Worcester Polytechnic Institute's Venice Project Center. Under the direction of Fabio Carrera, a native Venetian, the center's researchers concluded that in some areas 100 boats were carrying loads that could fit into 5. "So we designed a system to deliver cargo by destination instead of by product, which will result in a 90 percent reduction in cargo traffic in the canals, thus greatly alleviating the moto ondoso problem," says Carrera.

Nearly 30 organizations from around the world are working to save the city's endangered treasures. Since 1969, the International Private Committees for the Safeguarding of Venice has funded restoration of more than 100 monuments and 1,000 works of art. One, Save Venice, Inc., restored the 15th-century Santa Maria dei Miracoli, a Renaissance church with polychrome marble inlay inside and out.

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Marco Farnea (with his new $30,000 gondola at the mouth of the Grand Canal) says that no two gondoliers "have the same [rowing] style." After touring the city by gondola in 1869, Mark Twain wrote: "I am afraid I study the gondolier's marvelous skill more than I do the sculptured palaces we glide among."

"We have about 40 ongoing projects," director Melissa Conn tells me as we walk to the church of Santa Maria Gloriosa dei Frari. Mostly plain brick on the outside, it is known for its superb Assumption altarpiece, painted by Titian in 1516. Conn points out the monumental Renaissance tomb of Melchiore Trevisan, an important 15th-century military commander, which until recently was blackened by the grime of centuries. Now Trevisan's life-size marble statue looks as it did nearly 500 years ago, down to the detailed chain mail and metal helmet of his armor. "This job is taking about six months," Conn says, "including restoring the sarcophagus and frescoes in the chapel, and we'll spend about $40,000 on it."

I can't leave La Serenissima without exploring it from a gondola, so I book Marco Farnea, who learned to row from his father, Lino, captain of the *San Marco*. "Most Venetian gondoliers traditionally learn from their fathers, sometimes from their grandfathers," Marco tells me as I board his 10-day-old, $30,000 boat. "There are about 400 licensed gondoliers in Venice, and I can tell most of them apart by the way they row, since no two have exactly the same style."

As we float quietly along, often barely skimming by other gondolas, Farnea explains the symbolism of the steel ferro on the gondola's arched prow. "The six points facing forward stand for the six districts of Venice, the one facing back for the island of Giudecca, and the small arc at the top is for the Rialto Bridge," he says. "Its weight and shape help the gondolier maneuver." To obtain their licenses from the city, gondoliers, currently all men, have to pass a battery of tests. A few years ago, a woman took the tests and failed. "It's not true that they failed her because she was a woman," Marco insists. Then, with a conspiratorial grin, he adds: "But we do like our traditions here."

Longtime contributor Joseph A. Harriss wrote about van Gogh and Gauguin in December 2001. Bob Krist photographed farmers' markets for SMITHSONIAN*'s June 1999 issue.*

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The limerick is furtive and mean;

You must keep her in close quarantine,
Or she sneaks to the slums
And promptly becomes
Disorderly, drunk and obscene.

—Morris Bishop

There was a young lady called Harris,
That nothing could ever embarrass;
Till the bath-salts one day
In the tub where she lay
Turned out to be Plaster of Paris.

—Ogden Nash

BY DAVID STEWART

"HICKORY, DICKORY, DOCK, A MOUSE RAN UP THE CLOCK. . . ." SO vivid is the imagery and so strong the rhyme and meter that even the most poetically impaired can supply the last lines to this charming bit of doggerel. It has enthralled children since its publication in 1744 and is the first poem I can ever recall hearing, rendered dramatically by my kindergarten teacher some 70 years ago. Like a lot of well-remembered poetry, it is a limerick.

In college, after I had read most of the important English, American and European poets, I returned to nursery rhymes and considered myself witty because I could recite Edward Lear's "The Owl and the Pussycat went to sea. . . ," as well as other of his short, punchy poems, such as:

There was an old man with a beard
Who said: "It is just as I feared!
"Two owls and a hen,
"Four larks and a wren,
"Have all built their nests in my beard."

It recently dawned on me—now that I am, myself, an old man with a beard (but as yet no larks)—that I have been exposed to an astonishing number of limericks since I first heard about the clock-climbing mouse. During decades of relatively casual encounters with the work of numerous poets and writers, the trail has been generously littered with these ubiquitous five-line verses. How did such a rinky-dink metric form manage to insinuate itself into the creative life of so many authors?

Take Lewis Carroll. When the wildly imaginative storyteller was not tutoring young people, working on *Alice's Adventures in Won-*

ILLUSTRATIONS BY JEFF SEAVER

As the natives got ready to serve
A midget explorer named Merve;
"This meal will be brief,"
Said the cannibal chief,
"For this is at best an hors d'oeuvre."

—Ed Cunningham

derland and attending to his voluminous correspondence, he delighted in tossing off descriptions of, for example, a young man who grew constantly shorter, while . . .

His sister, called Lucy O'Finner,
Grew constantly thinner and thinner;
The reason was plain,
She slept out in the rain,
And was never allowed any dinner.

It's doubtful that the theatrical partnership of Gilbert and Sullivan would have maintained its long and enormously popular success in the absence of W. S. Gilbert's propensity for limericks, which appear in so many of his lyrics, such as his courtship advice from the 1888 light opera, *The Yeoman of the Guard,* on page 94. But Gilbert was also well known for his quirky, non-rhyming limericks, designed to catch the reader off guard:

There was an old man of St Bees
Who was horribly stung by a wasp.
When they said: "Does it hurt?"
He replied: "No, it doesn't—
It's a good job it wasn't a hornet!"

And, W. H. Auden, a brilliant poet whose literary corpus is marked by thoughtfulness and solemnity, seemed to find release in the humor of the limerick:

T. S. Eliot is quite at a loss
When clubwomen bustle across
At literary teas,
Crying: "What, if you please,
Did you mean by *The Mill on the Floss*?"

Limericks are essentially word puzzles in light verse, more often than not infused with sexual innuendo. Nobody wrote wittier ones than Ogden Nash, whose ingenious poetic playfulness complemented the form and who, as it happens, was born 100 years ago this month. Many know his "I would live all my life in nonchalance and insouciance, were it not for making a living, which is rather a nouciance." But fewer readers may be acquainted with his take on the Middle Ages:

A crusader's wife slipped from the garrison
And had an affair with a Saracen;
She was not over-sexed,
Or jealous, or vexed,
She just wanted to make a comparison.

In the course of a lengthy career writing science fiction stories, nonfiction and novels, Isaac Asimov published several volumes of what he called "lecherous limericks." Some readers may remember his:

A wonderful bird is the pelican,
His bill can hold more than his belican.
He can take in his beak
Food enough for a week;
But I'm damned if I see how the helican.

—Dixon Merritt

"On the beach," said John sadly, "there's such
A thing as revealing too much."
So he closed both his eyes
At the ranks of bare thighs,
And felt his way through them by touch.

Among other notable writers who have delighted in the limerick are Mark Twain, Dante Gabriel Rossetti, Walter de la Mare, Aldous Huxley, Conrad Aiken and Alfred Lord Tennyson. Notability is not, however, a prerequisite. The following lyric may leap to mind even if its author, Thomas Moore, remains largely unremembered:

The time I've lost in wooing,
In watching and pursuing,
The light that lies
In women's eyes
Has been my heart's undoing.

Moore, an early 19th-century Irish poet who lived most of his life in London, wrote about his native land with great feeling, which brings us to the limerick's Irish connection. It's a reasonable assumption that any verse with this name must have emerged from Ireland's Limerick City. Well, nearly. As the Irish might say, "It did, and it didn't."

To settle the matter, I traveled to the heart of limerick-land, the tiny village of Croom (pop. 1,000), ten miles south of Limerick City. Just a few steps from a short stone bridge over the Maigue, a swift river that features prominently in the origins of the limerick, I met two local historians, Mannix Joyce and Sean de Creag. Both are former schoolteachers and county council officials. De Creag, who lived most of his life in Croom, now sells newspapers and magazines; for the past 58 years, Joyce has written a weekly column on local history for the *Limerick Leader*.

De Creag led us down the road and through the open door of a pub. "This is the snug where the ladies of the village would come for their toddies," he said as we ordered glasses of the local cider. The windows of the sunny room looked out onto a farmyard with cackling chickens and a sleek dark rooster mounted on the top rail of a fence in the middle distance.

During the three-hour tutorial that followed, I became increasingly aware of the rhythmic sounds surrounding us: the chickens outside the window, the Maigue murmuring through the village, dogs barking. The cock on the fence rail, with uncanny timing, frequently punctuated the last line of an especially clever limerick with his piercing call.

Joyce arrived with a handful of scholarly materials, explaining to my dismay that few Irish people today walk around with limericks on the tips of their tongues. Even so, limericks remain deeply entrenched in Irish popular culture. In the early 20th century, limerick contests were taken so seriously that furnished homes and lifetime annuities were awarded to winners.

Historical events often figure in Irish limericks. Joyce told me about an outspoken Irish archbishop in Melbourne, Australia, who went around championing the Irish fight for freedom. "When the English learned he was coming this way," Joyce said, "they feared
he would
stir

A man who would woo a fair maid,
He should 'prentice himself to the trade,
And study all day
In a methodical way
How to flatter, cajole and persuade.

—W. S. Gilbert

up trouble. So the British Navy was dispatched to capture him on the high seas and take him to England. In the end, his capture proved a fiasco, largely because of the archbishop's unflappable nature." Joyce recited poet Beda Herbert's 1971 limerick:

There was a high cleric named Mannix,
Monumentally cool amid panics;
A fleet he could fool,
He played it so cool—
An iceberg among the *Titanics*.

It is widely (and probably incorrectly) thought that Edward Lear invented the limerick. He certainly made it popular. The *Oxford English Dictionary* first defined the word *limerick* in 1892, four years after Lear's death. But as O. E. Parrott makes clear in the opening pages of *The Penguin Bookof Limericks*:

The limerick's birth is unclear:
Its genesis owed much to Lear.
It started as clean,
But soon went obscene.
And this split haunts its later career.

To underscore this point, de Creag thereupon rolled out a local limerick. In the timeworn tradition of limerick recitation, he said, it had been "told to him by someone":

A sporting young lady of Croom,
Led life to the full, I'd assume.
A poet by day,
And by night a good lay,
Thus from bed to a verse, to her doom.

"He's being modest," said Joyce, smiling broadly. "I happen to know that my friend here sent that limerick to Norway where it was a great success. It was translated and published in Norwegian before returning to Ireland. We're talking about an international poetic medium, you see."

The five-line verse probably originated from the limerick-makers of Croom, known as the Maigue poets, who flourished in the 18th century. They were schoolteachers, priests and self-styled persons of letters, living within 20 miles of this southwestern Irish village. Their gatherings at inns and taverns were called poets courts, to which new members were invited by "warrants" to drink, recite, and often sing, their verses.

Their revels were a latter-day form of the ancient Irish bardic schools, con-

A freckled little girl sits at the front of a crowded table, staring at a cake, searching for the perfect wish—a bike, a puppy, a brother. No, a bike. Then letting loose with a gust. Eight candles flicker and smoke. In a town, in a home, at a fortieth birthday party, a woman lowers a glass of merlot, glances at her brother and smiles at a memory. A camera flash catches a few freckles.

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The Hoover, in grim silence, sat,
But sucking no more at the mat;
Quietly it grunted
As slowly it shunted,
And messily disgorged the cat.

—David Woodsford

ducted in Greek, Latin and Gaelic. Aware of official efforts to supplant Gaelic with the English language, the Maigue poets were protective of their native tongue, one reason that their poetry was little known until the middle of the 19th century, when English translations began to appear.

The Maigue poets apparently possessed prodigious memories, passing limericks and other poetry from one generation to the next orally, an ability that seems to live among Irish village poets to this day. "I once interviewed an elderly lady," Joyce said, "who could create excellent poetic descriptions of small towns from a few details people would give her. She didn't write them but spoke spontaneously. More than a year later—she was now well past 80—I visited her with a printed copy of the long poem she had first spoken to me. I offered to prompt her, but she would have none of that. 'Oh no,' she told me. 'I remember it entirely.' And she did. It was letter-perfect."

One of the Maigue's first-known limerick-makers was tavern owner John O'Toumy, who was born a few miles from Croom in 1706. Of his own business practices, he bemoaned:

I sell the best brandy and sherry,
To make my good customers merry.
But at times their finances
Run short as it chances,
And then I feel very sad, very.

To which Andrew McCrath, another Maigue poet, was quick to respond:

O'Toumy! You boast yourself handy
At selling good ale and bright brandy,
But the fact is your liquor
Makes everyone sicker,
I tell you that, I, your friend, Andy.

The verse form John O'Toumy and Andrew McCrath helped foster became an energetic dimension of the Irish cultural landscape. Centuries before step-dancing swept across our stages, sailors from around the world landed in Cork and made the short journey north to the taverns of Limerick. And while there's no concrete evidence to suggest how the limerick spread from continent to continent, the following explanation is offered by an anonymous bard:

The sailors returned to their ships
To contemplate thousands of trips,
Then set sail on the breeze
With short rhymes up their sleeves,
And limericks from Croom on their lips.

Now a freelance writer, David Stewart served for years as the director of international activities for the Corporation for Public Broadcasting. Jeff Seaver has illustrated stories on pi, chess and noise.

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THANKS TO NEW TECHNOLOGY, BACKYARD STARGAZERS HAVE TRAVELED LIGHT-YEARS OF LATE TO JOIN PROFESSIONALS IN MAPPING THE HEAVENS

BY TIMOTHY FERRIS

Amateur Tony Hallas photographed the Great Nebula (left) in Orion. Searching for Halley's Comet at a high-altitude observatory in Hawaii, Steve O'Meara used oxygen to sharpen his concentration.

This photograph of an amateurs' star party (on Vancouver Island, British Columbia) combined a time exposure with flash.

Stargazing, says Timothy Ferris, an award-winning writer on astronomical subjects who teaches at the University of California at Berkeley, "is at once one of the oldest and most ennobling, and one of the newest and most challenging of human activities." Ferris, 58, has been training an eye on the night sky since he was a boy in Florida and has written ten books and two PBS television programs on the universe and cosmology. He even produced for NASA a recording that was placed aboard the Voyager spacecraft, launched in 1977, and that would, in essence, speak for Earth and human civilization as Voyager hurtled through the solar system. The recording included 90 minutes of music from around the world, natural sounds of Earth, greetings in scores of languages and more than 100 photographs.

In his latest book, published this month by Simon & Schuster and excerpted here, Ferris reflects on his lifelong passion for amateur astronomy and reports on the worldwide revolution that he says is "sweeping through amateur astronomy, where depths of the cosmos previously accessible only to professionals have been brought within the reach of observers motivated simply by their own curiosity." Contemplating the heavens has earthly benefits, he adds. As Chinese astronomer Xie Renjiang wrote to Ferris recently, "Astronomy is the most significant [way to] unify us. Although we have different skin colors and live in different countries, we should all be family on this planet. No other cause is so noble in my eyes."

AT SUNDOWN, AT A STAR PARTY ON THE HIGH TEXAS plains near Fort Davis, west of the Pecos, the parched landscape was crowded with telescopes. Reared against the darkening skies to the west rose a set of rolling foothills known jocularly as the Texas Alps. To the east of us lay dinosaur country, with its wealth of oil.

The stars came out with imposing clarity—Orion fleeing toward the western horizon, pursued by the dog star, brilliant white Sirius, the square of Corvus the crow to the southeast, the scythe of Leo the lion near the zenith. The planet Jupiter stood almost at the zenith; scores of tele-

From *Seeing in the Dark* by Timothy Ferris © 2002. Reprinted by permission of Simon & Schuster, Inc.

ROGER RESSMEYER/CORBIS; P. 98 TONY AND DAPHNE HALLAS; P. 99 JONATHAN BLAIR/CORBIS

UNDER SKIES THIS TRANSPARENT, THE EARTH BECOMES A PERCH, A PLATFORM FROM WHICH TO VIEW THE REST OF THE UNIVERSE.

scopes were pointed toward it, like heliotropes following the Sun. As the gathering darkness swallowed up the valley, the sight of the observers was replaced by landbound constellations of ruby LED indicators on the telescopes' electronics, the play of red flashlights, and voices—groans, labored breathing, muttered curses and sporadic cries of delight when a bright meteor streaked across the sky. Soon it was dark enough to see the zodiacal light—sunlight reflected off interplanetary dust grains ranging out past the asteroid belt—stabbing the western sky like a distant searchlight. When the Milky Way rose over the hills to the east, it was so bright that I at first mistook it for a bank of clouds. Under skies this transparent, the Earth becomes a perch, a platform from which to view the rest of the universe.

I had come here to observe with Barbara Wilson, legendary for her sharp-eyed pursuit of things dark and distant. I found her atop a small ladder, peering through her 20-inch Newtonian—an instrument tweaked and collimated to within an inch of its life, with eyepieces that she scrubs with Q-Tips before each observing session, using a mixture of Ivory soap, isopropyl alcohol and distilled water. On an observing table, Barbara had set up *The Hubble Atlas of Galaxies*, the *Uranometria 2000* star atlas, a night-vision star chart illuminated from behind by a red-bulb light box, a laptop computer pressed into service as yet another star atlas, and a list of things she hoped to see. I'd never heard of most of the items on her list, much less seen them. They included Kowal's Object (which, Barbara informed me, is a dwarf galaxy in Sagittarius), the galaxy Molonglo-3, the light from which set out when the universe was half its present age, and obscure nebulae with names like Minkowski's Footprint, Red Rectangle, and Gomez's Hamburger.

John Dobson (top, with one of his telescopes), revolutionized amateur astronomy by designing telescopes capable of bringing the far reaches of space within view at reasonable cost. Barbara and Harry Wilson (above, with her 20-inch reflecting telescope) are regulars at the Texas Star Party, one of the largest in the nation. Barbara is credited with observing an astonishing 137 of the Milky Way's 150 known globular star clusters.

"I'm looking for the jet in M87," Barbara called down to me from the ladder. M87 is a galaxy located near the center of the Virgo cluster, sixty million light-years from Earth. A white jet protrudes from its nucleus. It is composed of plasma—free atomic nuclei and electrons, the survivors of events sufficiently powerful to have torn atoms apart—spat out at nearly the velocity of light from near the poles of a massive black hole at the center of this giant elliptical galaxy. (Nothing can escape from inside a black hole, but its gravitational field can slingshot matter away at high speeds.) To study the structure of the jet to map dark clouds in M87, professional astronomers use the most powerful instruments available, including the Hubble Space Telescope. I'd never heard of an amateur's having seen it.

There was a long pause. Then Barbara exclaimed, "It's there! I mean, it's *so* there!"

She climbed down the ladder, her smile bobbing in the dark. "I saw it once before, from Columbus," she said, "but I couldn't get anybody to confirm it for me—couldn't find anyone who had the patience that it takes to see this thing. But it's so obvious once you see it that you just go, 'Wow!' Are you ready to try?"

I climbed the ladder, focused the eyepiece, and examined the softly glowing ball of M87, inflated like a blowfish at a magnification of 770x. No jet yet, so I went into standard dim-viewing practice. Relax, as in

Amateur Hallas photographed the Whirlpool Galaxy, interacting with a smaller galaxy, at the Eagle Eye Observatory in California.

any sport. Breathe fairly deeply, to make sure the brain gets plenty of oxygen. Keep both eyes open, so as not to strain the muscles in the one you're using. Cover your left eye with your palm or just blank it out mentally—which is easier to do than it sounds—and concentrate on what you're seeing through the telescope. Check the chart to determine just where the object is in the field of view, then look a bit away from that point: the eye is more sensitive to dim light just off center than straight ahead. And, as Barbara says, be patient. Once, in India, I peered through a spotting telescope at a patch of deep grass for more than a minute before realizing that I was seeing the enormous orange-and-black head of a sleeping Bengal tiger. Stargazing is like that. You can't hurry it.

Then, suddenly, there it was—a thin, crooked, bone-white finger, colder and starker in color than the pewter starlight of the galaxy itself, against which it now stood out. How wonderful to see something so grand, after years of admiring its photographs. I came down the ladder with a big smile of my own. Barbara called a coffee break and her colleagues departed for the ranch house cafeteria, but she remained by the telescope in case anyone else came along who might want to see the jet in M87.

AMATEUR ASTRONOMY HAD GONE THROUGH A REVOLUTION since I started stargazing in the 1950s. Back then, most amateurs used reedy telescopes like my 2.4-inch refractor. A 12-inch reflector was considered a behemoth, something you told stories about should you be lucky enough to get a look through one. Limited by the light-gathering power of their instruments, amateurs mostly observed bright objects, like the craters of the Moon, the satellites of Jupiter, the rings of Saturn, along with a smattering of prominent nebulae and star clusters. If they probed beyond the Milky Way to try their hand at a few nearby galaxies, they saw little more than dim gray smudges.

TONY AND DAPHNE HALLAS

AS A BRILLIANT YOUNG COSMOLOGIST ONCE TOLD ME, "A CAREER IN ASTRONOMY IS A GREAT WAY TO SCREW UP A LOVELY HOBBY."

Roland Christen, who designs and produces sophisticated telescopes for amateurs, photographed a 1991 solar eclipse (above, left). Hallas captured the Horsehead Nebula (above, right), including the dark nebula known as Barnard 33, in constellation Orion in 1997.

Professional astronomers, meanwhile, had access to big West Coast telescopes like the legendary 200-inch at Palomar Mountain in Southern California. Armed with the most advanced technology of the day and their own rigorous training, the professionals got results. At Mount Wilson Observatory near Pasadena, the astronomer Harlow Shapley in 1918–19 established that the Sun is located toward one edge of our galaxy, and Edwin Hubble in 1929 determined that the galaxies are being carried apart from one another with the expansion of cosmic space. Professionals like these became celebrities, lionized in the press as hawkeyed lookouts probing the mysteries of deep space.

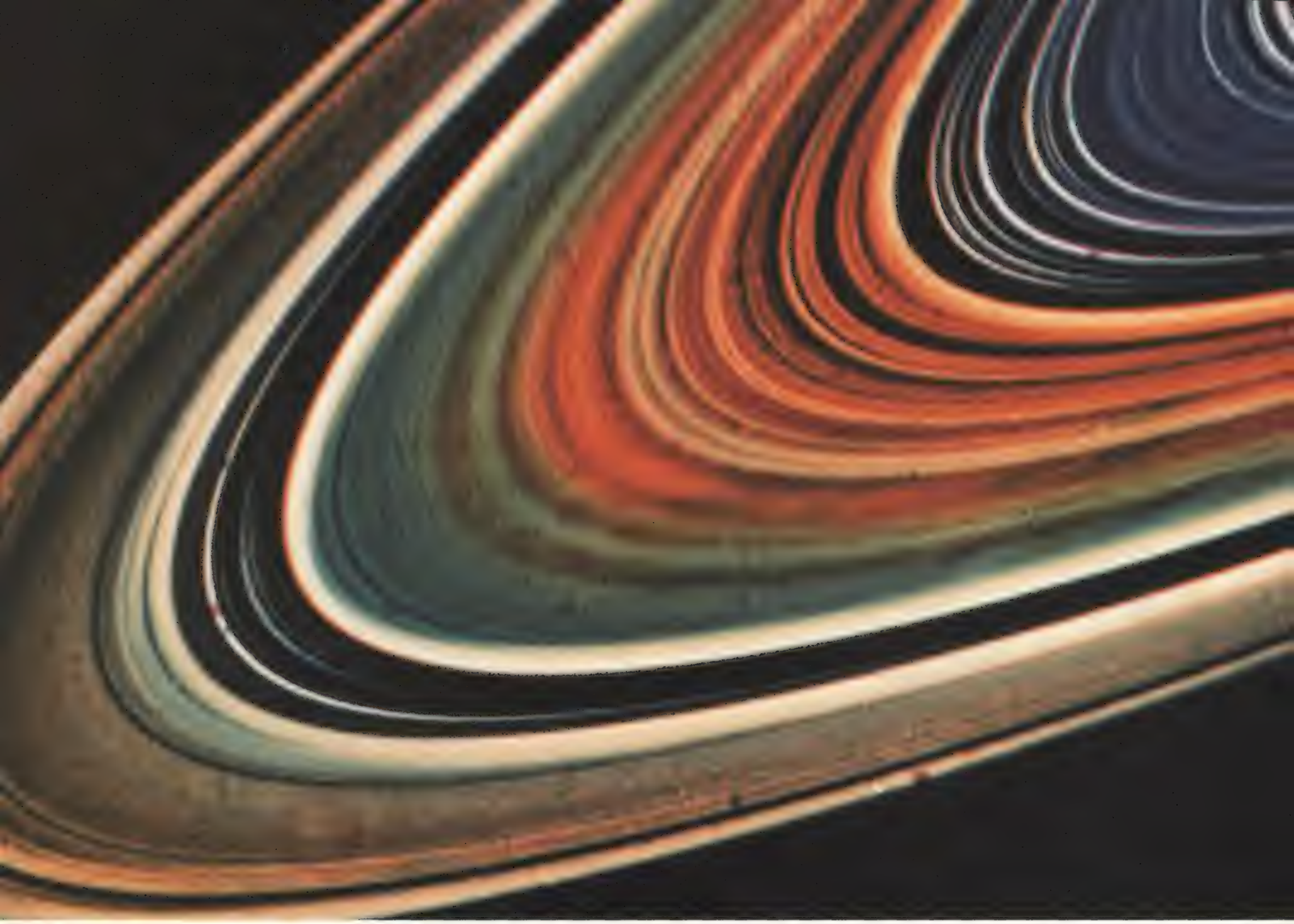
Which, pretty much, they were: theirs was a golden age, when our long-slumbering species first opened its eyes to the universe beyond its home galaxy. But observing the professional way wasn't usually a lot of fun. To be up there in the cold and the dark, riding in the observer's cage and carefully guiding a long exposure on a big glass photographic plate, with icy stars shining through the dome slit above and starlight puddling below in a mirror the size of a trout pond, was indubitably romantic but also a bit nerve-racking. Big-telescope observing was like making love to a glamorous movie star: you were alert to the honor of the thing, but aware that plenty of suitors were eager to take over should your performance falter.

Nor did academic territoriality, jealous referees, and the constant competition for telescope time make professional astronomy a day at the beach. As a brilliant young cosmologist once told me, "A career in astronomy is a great way to screw up a lovely hobby."

So it went, for decades. Professionals observed big things far away, and published in the prestigious *Astrophysical Journal*—which, as if to rub it in, ranked papers by the distances of their subjects, with galaxies at the front of each issue, stars in the middle, and planets, on the rare occasion that they appeared in the *Journal* at all, relegated to the rear. Amateurs showed schoolchildren the rings of Saturn at 76 power through a tripod-mounted spyglass at the State Fair. Inevitably, a few professionals disdained the amateurs. When Clyde Tombaugh discovered Pluto, the astronomer Joel Stebbins, usually a more charitable man, dismissed him as "a sub-amateur assistant." There were of course professionals who kept up good relationships with amateurs, and amateurs who did solid work without fretting over their status. But generally speaking, the amateurs lived in the valley of the shadow of the mountaintops. Which was odd, in a way, because for most of its long history, astronomy has been primarily an amateur pursuit.

The foundations of modern astronomy were laid largely by amateurs. Nicolaus Copernicus, who in 1543 moved the Earth from the center of the universe and put the Sun there instead (thus replacing a dead-end mistake with an open-ended mistake, one that encouraged the raising of new questions), was a Renaissance man, adept at many things, but only a sometime astronomer. Johannes Kepler, who discovered that planets orbit in ellipses rather than circles, made a living mainly by casting horoscopes, teaching grade school, and scrounging royal commissions to support the publication of his books. Edmond Halley, after whom the comet is named, was an amateur whose accom-

ROLAND CHRISTEN; TONY AND DAPHNE HALLAS



Striking celestial images, such as this one of the rings of Saturn taken by *Voyager* 2, have broadened astronomy's appeal.

plishments—among them a year spent observing from St. Helena, a South Atlantic island so remote that Napoléon Bonaparte was sent there to serve out his second and terminal exile—got him named Astronomer Royal.

Even in the 20th century, while they were being eclipsed by the burgeoning professional class, amateurs continued to make valuable contributions to astronomical research. Arthur Stanley Williams, a lawyer, charted the differential rotation of Jupiter's clouds and created the system of Jovian nomenclature used in Jupiter studies ever since. Milton Humason, a former watermelon farmer who worked as a muleteer at Mount Wilson, teamed up with the astronomer Edwin Hubble to chart the size and expansion rate of the universe.

The solar research conducted by the industrial engineer Robert McMath, at an observatory he built in the rear garden of his home in Detroit, so impressed astronomers that he was named to the National Academy of Sciences, served as president of the American Astronomical Society, a professional organization, and helped plan Kitt Peak National Observatory in Arizona, where the world's largest solar telescope was named in his honor.

Why were the amateurs, having played such important roles in astronomy, eventually overshadowed by the professionals? Because astronomy, like all the sciences, is young—less than 400 years old, as a going concern—and somebody had to *get* it going. Its instigators could not very well hold degrees in fields that didn't yet exist. Instead, they had to be either professionals in some related field, such as mathematics, or amateurs doing astronomy for the love of it. What counted was competence, not credentials.

Amateurs, however, were back on the playing field by about 1980. A century of professional research had greatly increased the range of observational astronomy, creating more places at the table than there were professionals to fill them. Meanwhile, the ranks of amateur astronomy had grown, too, along with the ability of the best amateurs to take on professional projects and also to pursue innovative research. "There will always remain a division of labor between professionals and amateurs," wrote the historian of science John Lankford in 1988, but "it may be more difficult to tell the two groups apart in the future."

The amateur astronomy revolution was incited by three technological innovations—the Dobsonian telescope, CCD

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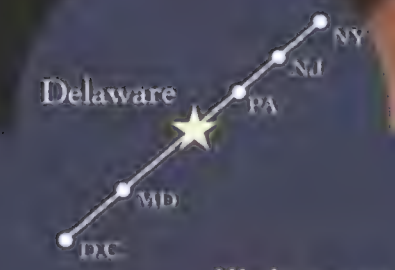

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OBSERVERS WITH DOBSONIANS COULD EXPLORE GALAXIES AND DEEP-SPACE PRECINCTS PREVIOUSLY RESERVED FOR PROFESSIONALS.

light-sensing devices and the Internet. Dobsonians are reflecting telescopes constructed from cheap materials. They were invented by John Dobson, a populist proselytizer who championed the view that the worth of telescopes should be measured by the number of people who get to look through them.

Dobson was well known in San Francisco as a spare, ebullient figure who would set up a battered telescope on the sidewalk, call out to passersby to "Come see Saturn!" or "Come see the Moon!" then whisper astronomical lore in their ears while they peered into the eyepiece. To the casual beneficiaries of his ministrations, he came off as an aging hippie with a ponytail, a ready spiel and a gaudily painted telescope so dinged-up that it looked as if it had been dragged behind a truck. But astronomical sophisticates came to recognize his telescopes as the carbines of a scientific revolution. Dobsonians employed the same simple design that Isaac Newton dreamed up when he wanted to study the great comet of 1680—a tube with a concave mirror at the bottom to gather starlight, and a small, flat, secondary mirror near the top to bounce the light out to an eyepiece on the side—but they were made from such inexpensive materials that you could build or buy a big Dobsonian for the cost of a small traditional reflector. You couldn't buy a Dobsonian from John Dobson, though; he refused to profit from his innovation.

In 1997, Hallas caught the comet Hale-Bopp in front of the reddish North America Nebula.

Observers armed with big Dobsonians didn't have to content themselves with looking at planets and nearby nebulae: they could explore thousands of galaxies, invading deep-space precincts previously reserved for the professionals. Soon, the star parties where amateur astronomers congregate were dotted with Dobsonians that towered 20 feet and more into the darkness. Now, thanks to Dobson, the greatest physical risk to amateur observers became that of falling from a rickety ladder high in the dark while peering through a gigantic Dobsonian. I talked with one stargazer whose Dobsonian stood so tall that he had to use binoculars to see the display on his laptop computer from atop the 15-foot ladder required to reach the eyepiece, in order to tell where the telescope was pointing. He said he found it frightening to climb the ladder by day but forgot about the danger when observing by night. "About a third of the galaxies I see aren't cataloged yet," he mused.

Meanwhile the CCD had come along—the "charge-coupled device"—a light-sensitive chip that can record faint starlight much faster than could the photographic emulsions that CCDs soon began replacing. CCDs initially were expensive but their price fell steeply. Amateurs who attached CCDs to large Dobsonians found themselves in command of light-gathering capacities comparable to that of the 200-inch Hale telescope at Palomar in the pre-CCD era.

The sensitivity of CCDs did not in itself do much to close the gap separating amateur from professional astronomers—since the professionals had CCDs too—but the growing quantity of CCDs in amateur hands vastly increased the number of telescopes on Earth capable of probing deep space. It was as if the planet had suddenly grown thousands of new eyes, with which it became possible to monitor many more astronomical events than there were professionals enough to cover. And, because each light-sensitive dot (or "pixel") on a CCD chip reports its individual value to the computer that displays the image it has captured, the stargazer using it has a quantitative digital record that can be employed to do photometry, as in measuring the changing brightness of variable stars.

Which brings us to the Internet. It used to be that an amateur who discovered a comet or an erupting star would dispatch a telegram to the Harvard College Observatory, from which a professional, if the finding checked out, sent postcards and telegrams to paying subscribers at observatories around the world. The Internet opened up alternative routes. Now an amateur who made a discovery—or thought he did—could send CCD images of it to other observers, anywhere in the world, in minutes. Global research networks sprang up, linking amateur and professional observers with a common

TONY AND DAPHNE HALLAS

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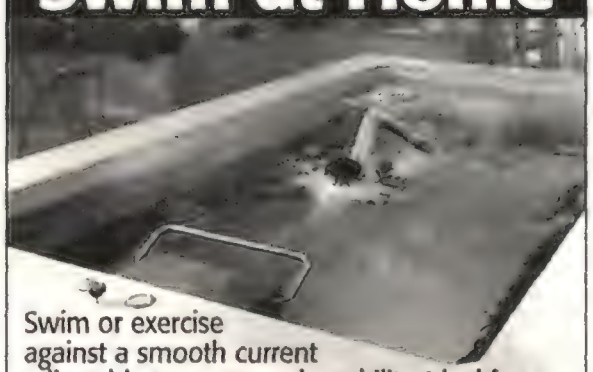

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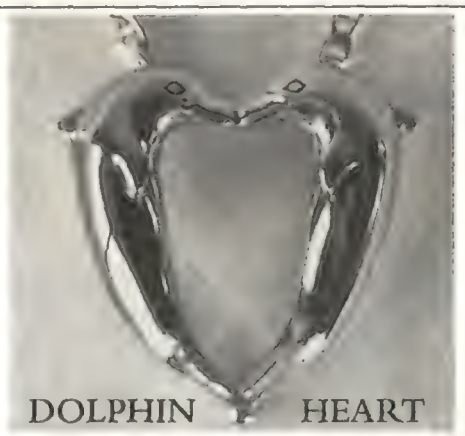
interest in flare stars, comets, or asteroids. Professionals sometimes learned of new developments in the sky more quickly from amateur news than if they had waited for word through official channels, and so were able to study them more promptly.

If the growing number of telescopes out there gave the Earth new eyes, the Internet fashioned for it a set of optic nerves, through which flowed (along with reams of financial data, gigabytes of gossip and cornucopias of pornography) news and images of storms raging on Saturn and stars exploding in distant galaxies. Amateur superstars emerged, armed with the skills, tools and dedication to do what the eminent observational cosmologist Allan Sandage called "absolutely serious astronomical work." Some chronicled the weather on Jupiter and Mars, producing planetary images that rivaled those of the professionals in quality and surpassed them in documenting long-term planetary phenomena. Others monitored variable stars useful in determining the distances of star clusters and galaxies.

Amateurs discovered comets and asteroids, contributing to the continuing effort to identify objects that may one day collide with the Earth and that, if they can be found early enough, might be deflected to prevent such a catastrophe. Amateur radio astronomers recorded the outcries of colliding galaxies, chronicled the ionized trails of meteors falling in daytime and listened for signals from alien civilizations.

The amateur approach had its limitations. Amateurs insufficiently tutored in the scientific literature sometimes acquired accurate data but did not know how to make sense of it. Those who sought to overcome their lack of expertise by collaborating with professionals sometimes complained that they wound up doing most of the work while their more prestigious partners got most of the credit. Others burned out, becoming so immersed in their



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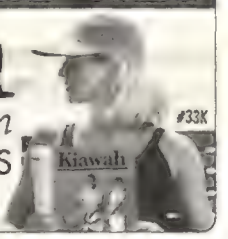

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IT WAS THE SORT OF WORK ASTRONOMERS DID YEARS AGO, WHEN OBSERVING COULD MEAN SPENDING ALL NIGHT DRAWING ONE PLANET.

hobby that they ran low on time, money, or enthusiasm and called it quits. But many amateurs enjoyed fruitful collaborations, and all were brought closer to the stars.

I MET STEPHEN JAMES O'MEARA AT THE Winter Star Party, held annually alongside a sandy beach in West Summerland Key, Florida. Arriving after dark, I was greeted at the gate by Tippy D'Auria, the founder of the Winter Star Party, who led me through thickets of telescopes reared against the stars.

"Steve's up there, drawing Jupiter through my telescope," Tippy said, nodding toward the silhouette of a young man perched atop a stepladder at the eyepiece of a big Newtonian that was pointing into the southwest sky. Comfortable in my lawn chair, I listened to the elders talk—a mix of astronomical expertise and self-deprecatory wit, the antithesis of pomp—and watched O'Meara drawing. He would peer at length through the eyepiece, then down at his sketch pad and draw a line or two, then return to the eyepiece. It was the sort of work astronomers did generations ago, when observing could mean spending a night making one drawing of one planet.

O'Meara likes to describe himself as "a 19th-century observer in the 21st century," and in meeting him I hoped to better understand how someone who works the old-fashioned way, relying on his eye at the telescope rather than a camera or a CCD, had been able to pull off some of the most impressive observing feats of his time.

While still a teenager, O'Meara saw and mapped radial "spokes" on Saturn's rings that professional astronomers dismissed as illusory—until *Voyager* reached Saturn and confirmed that the spokes were real. He determined the rotation rate of the planet Uranus, ob-

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taining a value wildly at variance with those produced by professionals with larger telescopes and sophisticated detectors, and proved to be right about that too. He was the first human to see Halley's comet on its 1985 return, a feat he accomplished using a 24-inch telescope at an altitude of 14,000 feet while breathing bottled oxygen.

After nearly an hour, O'Meara came down the ladder and made a gift of his drawing to Tippy, who introduced us. Clear-eyed, fit, and handsome, with black hair, a neatly trimmed beard, and a wide smile, O'Meara was dressed in a billowing white shirt and black peg pants. We repaired to the red-lit canteen for a cup of coffee and a talk.

Steve told me that he'd grown up in Cambridge, Massachusetts, the son of a lobster fisherman, and that his first childhood memory was of sitting in his mother's lap and watching the ruddy lunar eclipse of 1960. "From the very beginning I had an affinity with the sky," he said. "I just loved starlight." When he was about 6 years old he cut out a planisphere—a flat oval sky map—from the back of a box of cornflakes, and with it learned the constellations. "Even the tough kids in the neighborhood would ask me questions about the sky," he recalled. "The sky produced a wonderment in them. I believe that if inner-city kids had the opportunity to see the real night sky, they could believe in something greater than themselves—something that they can't touch, control or destroy."

When O'Meara was about 14 years old he was taken to a public night at Harvard College Observatory, where he waited in line for a look through its venerable Clark nine-inch refractor. "Nothing happened for a long time," he recalled. "Eventually people started wandering off, discouraged. The next thing I knew I was inside the dome. I could hear a whirring sound and see the telescope pointing up at the stars, and a poor guy down there at the eye-

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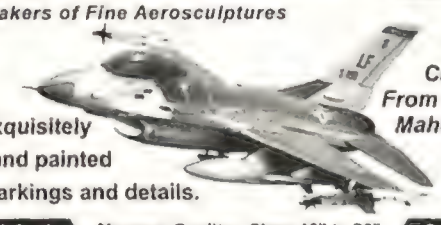

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piece—searching, searching—and he was sweating. I realized that he was trying to find the Andromeda galaxy. I asked him, 'What are you looking for?'

"'A galaxy far away.'

"I waited a few minutes, then asked, 'Is it Andromeda?' There was a silence, and finally he said, 'Yeah, but it's difficult to get, very complicated.'

"'Can I try?'

"'Oh, no, it's a very sophisticated instrument.'

"I said, 'You know, nobody's behind me. I can get it for you in two seconds.' I got it in the field of view.

"Everyone who had waited in line got to see the Andromeda galaxy through the telescope, and after they left he said, 'Show me what you know.' He was just a graduate student, and he didn't really know the sky. I showed him around, acquainted him with Messier galaxies and all sorts of things. We stayed up till dawn. The next morning he took me to the business office and they gave me a key, saying that if I helped them out with open houses, in return I could use the scope any time I wanted. So now I was a 14-year-old kid with a key to the Harvard College Observatory!"

For years thereafter the observatory was O'Meara's second home. After school he would work afternoons in a Cambridge pharmacy, then spend his nights at the telescope, patiently making drawings of comets and planets. "Why draw at the telescope? Because what you get on film and CCD does not capture the essence of what you see with the eye," he told me. "Everyone looks at the world in a different way, and I'm trying to capture what I see, and encourage others to look, to learn, to grow and understand, to build an affinity with the sky.

"Anyone who wants to be a truly great observer should start with the planets, because that is where you learn patience. It's amazing what you can learn to see, given enough time. That's

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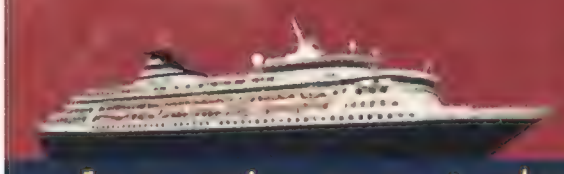

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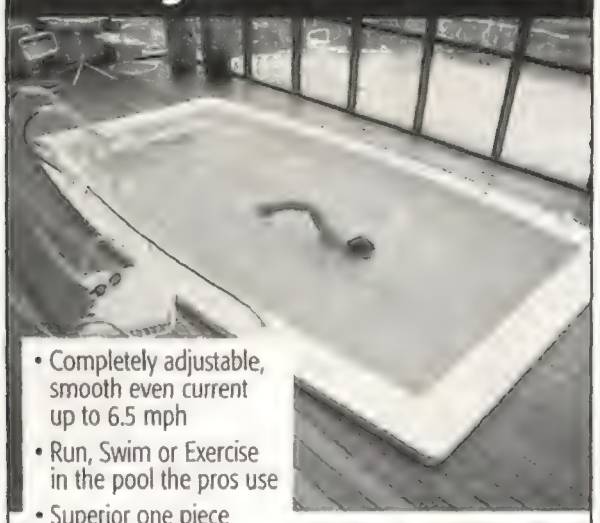

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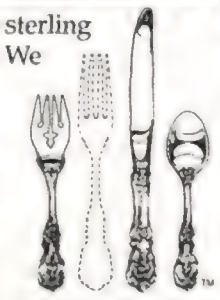

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the most important and critical factor in observing—time, time, time—though you never see it in an equation."

In the mid-1970s, O'Meara studied the rings of Saturn at the behest of Fred Franklin, a Harvard planetary scientist. He began seeing radial, spokelike features on one of the rings. He included the spokes in the drawings that he would slip under Franklin's office door in the morning. Franklin referred O'Meara to Arthur Alexander's *The Planet Saturn*. There O'Meara learned that the 19th-century observer Eugene Antoniadi had seen similar radial features in another ring.

But the consensus among astronomers was that they must be an illusion, because the differential rotation rate of the rings—they consist of billions of particles of ice and stone, each a tiny satellite, and the inner ones orbit faster than the outer ones—would smear out any such features. O'Meara studied the spokes for four more years, determining that they rotated with a period of ten hours—which is the rotation period of the planet, but not of the rings. "I did not find one person, honestly, who ever supported me in this venture," O'Meara recalled.

Then, in 1979, the *Voyager 1* spacecraft, approaching Saturn, took images that showed the spokes. "It was an overpowering emotion, to have that vindication at last," O'Meara said.

I asked Steve about his determination of the rotation period of Uranus. This had long been unknown, since Uranus is remote—it never gets closer than 1.6 billion miles from Earth—and shrouded in almost featureless clouds. He told me that Brad Smith, the astronomer who headed the *Voyager* imaging team, "called me one day and said, 'OK, Mr. Visual Guy, *Voyager* is going to be at Uranus in a few years, and I'm trying to first obtain the rotation period for Uranus. Do you think you can do it visually?' I said, 'Well, I'll try.'" O'Meara first read up on the his-

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tory of Uranus observations and then inspected the planet repeatedly, starting in June 1980. He saw nothing useful until one night in 1981, when two fantastically bright clouds appeared. "I followed them as they did a sort of dance over time, and from these observations, with some help, I determined where the pole was, modeled the planet, and got a rotation period for each cloud, averaging around 16.4 hours." This number was disturbingly discordant. Brad Smith, observing with a large telescope at Cerro Tololo Observatory in Chile, was getting a rotation period of 24 hours, and a group of professional astronomers at the University of Texas, using CCD imaging, were also getting 24 hours.

To test O'Meara's vision, Harvard astronomers mounted drawings on a building across campus and asked him to study them through the nine-inch telescope he had used as a teenager. Although others could see little, O'Meara accurately reproduced the drawings. Impressed, the astronomers vouched for his Uranus work, and his results were published by the International Astronomical Union, a professional group. When *Voyager* reached Uranus, it confirmed that the planet's rotation period, at the latitude of the clouds O'Meara had seen, was within one-tenth of an hour of his value.

WE FINISHED OUR COFFEE AND MADE ready to go back out into the darkness. "I've always been strictly a visual observer, researching the sky with an eye to finding something new there," O'Meara said.

"We're all star people, in the sense that we're all created from star stuff, so it's in our genes, so to speak, that we're curious about the stars. They represent an ultimate power, something we cannot physically grasp. When people ask, 'Why, God?' they don't look down at the ground. They look up at the sky."

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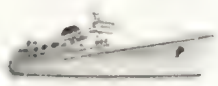

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Sounding the Alarm

FORTY YEARS AGO, RACHEL CARSON'S SILENT SPRING FOREVER CHANGED OUR VIEW OF THE ENVIRONMENT

BY BRUCE WATSON

A MONTH BEFORE WORLD WAR II ended, a relatively unknown writer named Rachel Carson proposed an article for *Reader's Digest* about the effects of the pesticide DDT on what she called "the delicate balance of nature." The shy woman assured the editors that "it's something that really does affect everybody." They turned her down. Perhaps they felt a story about pesticides would be too depressing. Or maybe it was that DDT, then widely used in the United States, had likely saved thousands of American Marines and soldiers by killing disease-carrying insects on far-off beachheads. Carson filed the subject away and went on to write best-selling books on the wonders of the sea. A dozen years later, she decided to take up the topic again. This time would be different.

While authors and publishers like to believe that a single book can change the world, few books actually have had such an impact. Yet the day it hit bookstores 40 years ago this month, Rachel Carson's *Silent Spring* fueled a vigorous public debate about the use of chemicals in our environment that has yet to be resolved. "Without this book," wrote former Vice President Al Gore in the introduction to a 1994 reprint of it, "the environmental movement might have been long delayed or never have developed at all." This complex, lyrical volume led not only to the banning of DDT but eventually to the formation of the U.S. Environmental Protection Agency. "After *Silent Spring*, people began to think about the chemicals they were handling, what they were doing to the environment, and what scientists weren't telling them,"

Carson (in Maine in 1962) died just two years after *Silent Spring* was published.

ERICH HARTMANN/MAGNUM PHOTOS

says Carson biographer Linda Lear (*Rachel Carson: Witness for Nature*, 1997). "They began to question the very direction of technology."

Carson had no intention of starting a movement. Working against time following a diagnosis of cancer, she sounded her wake-up call in the name of songbirds. "If I kept silent I could never again listen to a veery's song without overwhelming self-reproach," she wrote. But in the fall of 1962, many scientists and people in the chemical industry wished she had kept silent.

Growing up in western Pennsylvania, Rachel Louise Carson, known to friends as Ray, immersed herself in nature and books, especially the sea sagas of Melville and Conrad. At the Pennsylvania College for Women in the mid-1920s, she changed her major from English to biology, but retained a deep love of writing. Eventually she earned a master's degree in marine zoology from Johns Hopkins University and became a junior aquatic biologist for the U.S. Bureau of Fisheries in Washington, D.C. Her first book, *Under the Sea-Wind*, was published in 1941 and sold fewer than 2,000 copies. But it put her in contact with scientists who were beginning to ask hard questions about the fate of the earth.

In the late 1940s, while working as publications editor for the Fish and Wildlife Service, she began her second book, *The Sea Around Us*. The literary sensation of 1951—topping best-seller lists and winning a National Book Award—it outlined the latest science informing our understanding of the ocean. Carson almost instantly became the nation's unofficial spokesperson for the sea. "Heavens!" she wrote a friend after winning another accolade. "Is this all about me—it is really ridiculous!" *Sea*'s success enabled her to become a full-time writer and buy a cottage on the coast of Maine, which would become a sanctuary for the rest of her life. While she would write another book about the sea, she continued to harbor nagging questions about the effect of pesticides on the land.

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Agricultural use of conventional pesticides in the United States peaked in 1980.

(DDT) was first used as an insecticide in 1939. Just a few grains of the white powder would miraculously wipe out colonies of mosquito larvae. During World War II, B-25 bombers sprayed DDT prior to invasions in the Pacific. After the war, DDT would all but wipe out malaria in the developed world and drastically reduce it elsewhere. (The National Academy of Sciences reported in 1970 that DDT had saved more than 500 million lives from malaria.) Paul Müller, the chemist who first turned it on unsuspecting flies, won a Nobel Prize in 1948 for his work.

By the late 1950s, DDT production had nearly quintupled from World War II levels as municipal authorities took to spraying the chemical on American suburbs to eradicate tent caterpillars, gypsy moths and the beetles that carried Dutch elm disease.

But the chemical had a disturbing characteristic: it killed indiscriminately. After finding seven dead songbirds in her yard after the area had been sprayed against mosquitoes, a Massachusetts friend of Carson's wrote a letter to the *Boston Herald* in 1958 demanding that officials "stop the spraying of poisons from the air." Carson read the letter and realized that "everything which meant most to me as a naturalist was being threatened." She decided to make DDT the subject of her next book, tentatively entitled *Man Against the Earth*.

But working on it in 1960, she was diagnosed with breast cancer and underwent a mastectomy. Subsequent radiation treatments left her nauseated and bedridden. The book she had expected to finish in a few months dragged on for four years. Finally, in June 1962, the first of a three-part excerpt from *Silent Spring* appeared in the *New Yorker* magazine.

Before the final installment hit newsstands, the Velsicol Corporation, which manufactured the pesticide chlordane (banned in 1988), threatened to sue the magazine for libel. "Everything in those articles has been checked and is true," replied the *New Yorker*'s legal counsel. "Go ahead and sue." The company never did, but the attacks had only begun. One reader wrote that Carson's work "probably reflects her Communist sympathies."

Then, in July, news broke that a supposedly harmless drug given to thousands of pregnant women in Europe for morning sickness had been determined to cause widespread birth defects. Newspapers and magazines ran photographs of babies born without arms and legs or otherwise physically deformed. "It's all of a piece," said Carson. "Thalidomide and pesticides—they represent our willingness to rush ahead and use something new without knowing what the results are going to be."

Suddenly in a single summer, chemical science had fallen from its pedestal. By late August, reporters were asking President Kennedy if federal officials would be investigating the long-range effects of pesticides. "They already are," he answered. "I think particularly, of course, since Miss Carson's book, but they are examining the matter."

Silent Spring went on sale September 27 and raced to the top of the *New York Times* best-seller list where it stayed for most of the fall. By Christmas, the book, which begins with Carson's fable about an idyllic countryside that teemed with wildlife until "a strange blight crept over the area and everything began to change," had sold more than 100,000 copies. In subsequent chapters, the author followed the trail of pesticides from farm to family table, provided a "Who's Who" of toxic chemicals—DDT, chlordane, malathion, parathion—and noted that pesticides accumulate in fatty tissues of organisms.

Reaction to *Silent Spring* was quick, strong and largely negative. *Life* claimed that Carson had "overstated her case." *Time*, citing scientists' claims that insecticides were "harmless," dismissed it as an "emotional and inaccurate outburst." The chemical and food industries came after Carson aggressively. *Chemical and Engineering News*, a chemical industry trade magazine, linked Carson with "pseudo-scientists and faddists," denounced her "high-pitched sequences of anxieties" and belittled her credentials. The Nutrition Foundation mailed scathing reviews of the book to newspapers. The National Agricultural Chemicals Association launched a $250,000 campaign to refute it, and the Monsanto Corporation published a parody of Carson's opening fable, describing a world without pesticides, overrun by insects and disease. In a cartoon in the November 10, 1962, issue of the *Saturday Review*, a man lamented "I had just come to terms with fallout, and along comes Rachel Carson."

But there were voices of praise as

TIM MCCABE/USDA

well. Supreme Court Justice William O. Douglas called *Silent Spring* "the most important chronicle of this century for the human race."

While undergoing debilitating radiation treatments, Carson answered her critics. No civilization, she said, "can wage relentless war on life without destroying itself, and without losing the right to be called civilized." She insisted she was not against all pesticides and had never called for banning them, only for restricting their use. Public opinion wavered. Then television tipped the scales in her favor.

In April 1963, 15 million Americans watched *CBS Reports*' "The Silent Spring of Rachel Carson." "We still talk in terms of conquest," Carson said. "I think we're challenged, as mankind has never been challenged before, to prove our maturity and our mastery, not of nature but of ourselves." Her thoughtful and reserved presentation struck a chord with viewers: hundreds wrote concerned letters to Carson, CBS, the USDA, the Public Health Service and the FDA. A month later, President Kennedy's Science Advisory Committee released its own report on pesticides, which backed Carson's thesis, criticized the government and the chemical industry, and called for "orderly reductions of persistent pesticides."

Today, despite the banning of DDT in 1972, pesticides are still widely used, and Carson, who died in 1964 at age 56 of heart disease and the cancer she battled so valiantly, still comes in for criticism. "Rachel Carson's book was a brilliant piece of writing and a seminal work, but it's clear now that she was more fearful of pesticides than was warranted," says Dennis Avery, former senior agriculture expert with the State Department and author of *Saving the Planet With Pesticides and Plastic*. While admitting that some dangers exist to the farmers who handle concentrated amounts of pesticides, Avery maintains that the "Green Revolution" of fertilizers, pesticides and genetically improved seeds has tripled crop yields since 1950 and saved 12 million square miles of natural habitat that otherwise would have been cleared for farmland in order to maintain the nation's food supply.

But veteran environmentalist Barry Commoner insists that pesticides remain a significant danger to the environment and human health. "Enough is known now that we could greatly reduce and eventually eliminate the harm caused by our use of pesticides and herbicides through organic farming and integrated pest management," he says. "We are still exposed to pesticides in our diet, and not much is known about their medical consequences. Since *Silent Spring*, the only real improvement has been for the birds. Thanks to the elimination of DDT, the osprey are better off, but I don't think we are."

Silent Spring reported that chemical companies in the United States produced about 32,000 tons of pesticides in 1960. Today the EPA says that farmers, consumers and the government use about 615,000 tons of conventional pesticides each year. (Most pesticides used today, however, are less toxic and break down faster in nature than those used 40 years ago.) And, as Carson warned, insects continue to develop chemical resistance. According to the Worldwatch Institute, an environmental policy think tank, a higher percentage of crops in America are now lost to pests than before pesticides were first widely used. In an attempt to safeguard our food, Congress passed the Food Quality Protection Act in 1996, giving the EPA a decade to reevaluate the safety of 9,000 pesticides.

If debate over Carson's thesis continues, few doubt her impact. "Rachel Carson's legacy has less to do with pesticides than with awakening of environmental consciousness," says biographer Lear. "She changed the way we look at nature. We now know we are a part of nature, and we can't damage it without it coming back to bite us."

Bruce Watson wrote in May about Italy's Mille Miglia automobile race.

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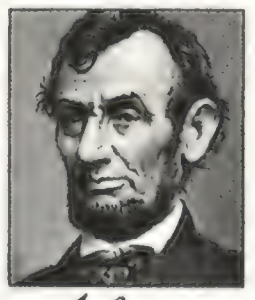

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B O O K S

B O O K S

The Summer of My Greek Taverna

Tom Stone

Simon & Schuster, $24

LOTS OF PEOPLE FANtasize about running a restaurant, but most lack the imagination—or the occasion—to do so. Tom Stone, an American writer and a former Broadway stage manager, actually carried out his fantasy—at a seaside café on an idyllic Greek island—with disastrous results. These are at last redeemed, three decades after the fact, by *The Summer of My Greek Taverna*, his sweetly lyrical evocation of an interlude in his early 40s. (The author remains studiously vague about his story's time frame and has changed the names of characters, including his wife, presumably to protect the innocent—and himself—from the threat of libel suits.)

In 1969, Stone jettisoned his life as a fledgling stage director in New York for Greece. His travels took him to the island of Patmos, where he settled in to write novels. There, he met a French painter he calls Danielle. They married and moved to Crete, where Stone earned a pittance teaching English as a second language. Soon they found themselves with a daughter and a son and barely enough income to make ends meet.

It seemed a gift from the gods when a friend from Patmos, who owned a taverna overlooking a pristine stretch of beach, called with a

business proposition. He suggested that Stone, an accomplished amateur chef, become his partner during the crush of the summer season. For a modest investment, the two would share major profits.

Danielle is skeptical ("You are crazy," she informs her husband) and points out that Theológos, the Greek friend, has earned a nickname: O Ladós—the oily one. Stone scoffs at his wife's objections: "Let everyone else—the cynical French and the suspicious Greek—be wary of Theológos. I was not only going to prove them wrong . . . but the two of us were going to make a tidy little sum in the process."

Stone was seduced, too, by the prospect of returning to Patmos, the glorious little island revered as the place where John the Evangelist is said to have experienced the visions set down in the Book of Revelation.

Stone soon discovers, though, that running a restaurant is a lot harder than it looks. And as the tourist season progresses, he also begins to realize that he is being taken. He slaves in the kitchen and waits on tables, while Theológos avoids nearly all work and shamelessly fleeces his friend. Stone, who readily admits to being "blindly trusting and laughably naive," lost most of the money he invested in the enterprise.

In the end, though, his loss is our gain. The author, who today makes his living as a screenwriter in Hollywood, is very good company indeed. The taverna may have cost him some cash and even more illusions, but the experience has yielded a colorful and richly observed memoir. As a Greek friend tells him after reading a portion of his manuscript for this book: "Thomáki, you haven't changed! You tell wonderful stories, but you're always making things better than they were!"

Reviewer Dan Akst is a writer living in upstate New York.

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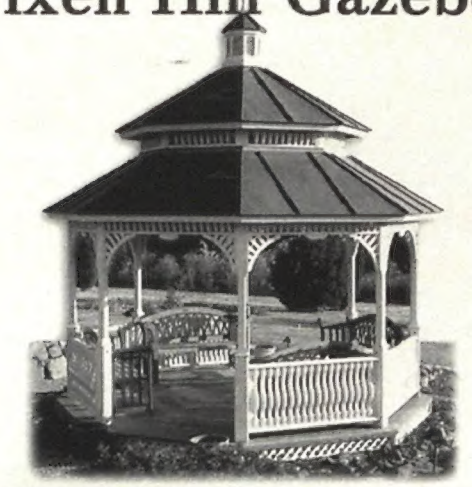

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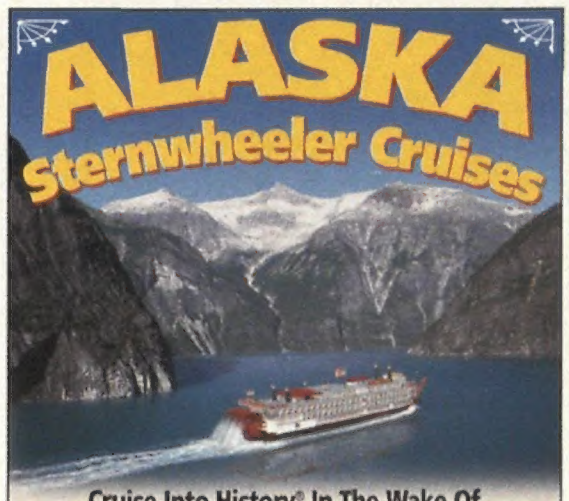

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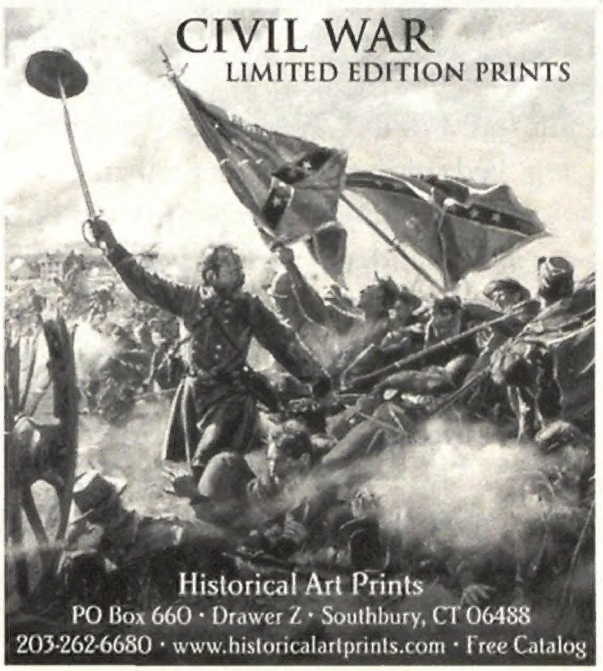

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THE LAST PAGE

Hot Dogs & Headstones

ONE YEAR LATER, NEW YORKERS GO ABOUT THEIR BUSINESS WITH VERVE AND BRASH DISPATCH. BUT IT'S NOT THE SAME

BY SAMUEL G. FREEDMAN

On the afternoon before Independence Day, I went back to St. Paul's Chapel. I had made my last pilgrimage there on a chilly autumn dusk, not long after September 11, 2001, tiptoeing among the mourners, mannerly in deference to the dead. The chapel, you see, sits along the eastern rim of the slaughtering ground where the Twin Towers once stood, and in the absence of a memorial there, this centuries-old stone sanctuary has become a communal shrine.

All these months later, the steps and sidewalk and fence bore familiar tokens of life and afterlife: a banner from Miss August's kindergarten, a baseball cap from the Daytona Beach Fire Department, teddy bears, ballet slippers, origami birds, rosary beads, a laminated photograph of the late Michael Tinley with his family, a crown of thorns. When a boy picked up a toy model of a police car, his older brother told him, "Don't touch anything here."

As I looked closer I saw the difference between autumn and summer. Sunlight had faded the colors on flags drawn with felt-tip markers. Rain had smeared the ink on the poems. The pavement was spotted with dark circles from votive candles long since melted. T-shirts left behind by volunteer rescue crews hung limply from gateposts, sullied with soot and car exhaust.

I suppose the entropy could be taken as a slander against the fallen. But I saw in the slow decay some natural process—the gardener's compost mound, the forest floor. And, like them, this decomposition prophesied rebirth.

The streets around St. Paul's, once barricaded and rained with ash, told of a kind of resurrection. Buses idled. Taxis honked. Bike messengers squirted through traffic. Pedestrians bustled, their post-attack politesse a distant memory. Even the vendors were back, crass as ever, hawking Twin Tower snow globes and paperweights. A few blocks away Mayor Michael Bloomberg was announcing an annual hot-dog-eating contest.

St. Paul's Chapel: Communal shrine

This is not our former normality, or our giddy ignorance. This is principled resistance, for we know we are not the same people in the same city. We are on war footing now. Our nerves, like radar, pulsate.

One recent Saturday I drove my children to their weekly swimming lesson. As I parked in a garage near the pool, the attendant approached, rolling a metal rod on two wheels, a contraption, I imagined, a surveyor might use to calibrate precise distances. Then I noticed a mirror fastened to the bottom of the rod. The attendant proceeded to check my car's undercarriage for bombs.

Later that weekend I turned the corner from Riverside Drive up the half-block hill to my apartment house. The superintendent was on the stoop, chatting with a tenant. There had been a suitcase at the corner of Broadway; the police had come and gone.

"Just a little bomb scare," the super was saying.

"*Little?*" the tenant replied.

These frights remind us of what we lost and what we owe. It used to be that graffiti artists fashioned their most extravagant murals for slain drug dealers. Recently, there appeared on the Queens side of the Midtown Tunnel a vast graffiti Guernica of September 11—eagle, Uncle Sam, flag and firefighters like Marines at Iwo Jima.

In the days after the attack, my son's fourth-grade teacher gave each child in class a lump of clay and the assignment to depict freedom. The results took the form of an open door, unlocked handcuffs, outstretched arms, a mother and child running together, the Statue of Liberty. "I made a happy face," wrote a girl named Imani, explaining her contribution, "because everybody is happy when they're free."

We may never be free or happy in quite the same way again. When I jog to the George Washington Bridge and find a police car guarding the stanchion, when I see the black bunting on a Greenwich Village fire station, when I gaze at the floodlit cairn of Ground Zero through an airplane window, I think of a Jewish mourning ritual. At the one-year anniversary of a loved one's death, it is expected that you resume your former life and, at the same time, mark the grave with a headstone.

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